

**United States Department of the Interior
Bureau of Land Management
Royal Gorge Field Office
3028 E. Main Street
Cañon City, CO 81212**

Environmental Assessment

USA Federal APDs
DOI-BLM-CO-200-2012-0087 EA

September, 2012



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CHAPTER 1 - INTRODUCTION

1.1 IDENTIFYING INFORMATION

CASEFILE/PROJECT NUMBER (optional):

PROJECT TITLE:

USA Fed 02N-36HZ
USA Fed 02C-36HZ
USA Fed 27N West-36HZ
USA Fed 01N-36HZ
USA Fed 26C-36HZ
USA Fed 27N East- 36HZ
USA Fed 29C-36HZ
USA Fed 03N-36HZ
USA Fed 28N-36HZ
USA Fed 04N-36HZ
USA Fed 29N-36HZ
USA Fed 30C-36HZ

PLANNING UNIT:

LEGAL DESCRIPTION: Weld County, T3N., R66W., Sec. 36

APPLICANT: Kerr-McGee O&G Onshore LP.

1.2 INTRODUCTION AND BACKGROUND

BACKGROUND: This EA has been prepared by the BLM to analyze environmental impacts of well pad, access road, and connecting pipeline construction on federal surface/federal minerals, located in the central part of Weld County 17 miles south of the City of Greeley, Colorado. The federal mineral estate within the project boundary is leased and subject to oil and gas development.

1.3 PURPOSE AND NEED

The purpose of the action is to provide the applicant the opportunity to develop their leases for the production of oil and gas. The need for the action is to develop oil and gas resources on Federal Lease COC37842 consistent with existing Federal lease rights provided for in the Mineral Leasing Act of 1920, as amended.

1.4 DECISION TO BE MADE

The BLM will decide whether to approve the proposed USA Fed APDs (12 total) project based on the analysis contained in this Environmental Assessment (EA). This EA will analyze the proposed action; to construct a well and facility pads, connecting pipeline and underground electrical lines, in order to drill and develop federal minerals from a federal surface. Access to the proposed well pads would be on existing county and rural roads. The finding associated with this EA may not constitute the final approval for the proposed action.

1.5 PLAN CONFORMANCE REVIEW

PLAN CONFORMANCE REVIEW: The Proposed Action is subject to and has been reviewed for conformance with the following plan (43 CFR 1610.5, BLM 1617.3):

Name of Plan: Northeast Resource Area Plan and Record of Decision as amended by the Colorado Oil and Gas Final EIS and Record of Decision (RD)

Date Approved: 09/16/86 amended 12/06/91

Decision Number: O&G Resources, Issue 21

Decision Language:

Other NEPA: EA CO-050-88-NE-07 and amendment CO-050-89-NE-19

In January 1997, the Colorado State Office of the BLM approved the Standards for Public Land Health and amended all RMPs in the State. Standards describe the conditions needed to sustain public land health and apply to all uses of public lands.

Standard 1: Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes.

Standard 2: Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance such as fire, severe grazing, or 100-year floods.

Standard 3: Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and habitat's potential.

Standard 4: Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.

Standard 5: The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM lands will achieve or exceed the Water Quality Standards established by the State of Colorado.

Because standards exist for each of these five categories, a finding must be made for each of them in an environmental analysis. These findings are located in Chapter 3 of this document.

1.6 SCOPING, PUBLIC INVOLVEMENT AND ISSUES

1.5.1 Scoping: NEPA regulations (40 CFR §1500-1508) require that the BLM use a scoping process to identify potential significant issues in preparation for impact analysis. The principal goals of scoping are to allow public participation to identify issues, concerns, and potential impacts that require detailed analysis.

Persons/Public/Agencies Consulted: Scoping, by posting this project on the Royal Gorge Field Office NEPA website, was the primary mechanism used by the BLM to initially identify issues. No comments were received.

Issues Identified:

No issues were identified during public scoping.

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

The BLM has received 12 Application Permits to Drill (APDs), proposing the construction of 4 well pad locations, 2 facility pads, and pipeline gathering system on federal surface/federal minerals in the central part of Weld County, 17 miles south of the City of Greeley. The federal mineral estate is leased and subject to oil and gas development.

National Oceanic and Atmospheric Administration (NOAA) is the current surface management agency of the 640 acres of surface property, and the BLM manages the subsurface federal mineral estate on approximately 630 acres within this 640 acre portion of section 36. The lease is located in the Denver Julesburg Basin (D-J Basin) and Wattenberg Field. There are currently 41 producing wells and 4 facility (central tank battery consisting of 2 to 3 tanks, 2 - 4 separators, and gas meters) sites located on the NOAA site. The operator uses a central liquid gathering system which limits traffic and facilitates reclamation efforts. The existing producing wells on the lease were drilled over a period of time beginning in 1989 to 2010. The NOAA Platteville property is located 4.5 miles east of Highway 85, east and slightly south of the Town of Platteville. The property was obtained initially by NOAA for purposes of various experimental and research opportunities related to the atmosphere. It was valuable for its relative isolation which provided “quiet” radio frequency contamination. Over time, because of the increased population density and growth along the Highway 85 corridor, the value has decreased for certain types of research, but it continues to be owned by the Department of Commerce. Currently, the property is not accessible to the public. The surface use for Oil and Gas development has been managed by the BLM in conjunction with NOAA and The Department of Commerce through a cooperative letter of agreement signed in 1989.

The property is approximately a square section (1 mile square), fenced on all sides by barb wired fence. A building complex is constructed in the center of the property, with a gate at the northwest corner, and a primary access road from the gate to the building site. The majority of NOAA government owned equipment is near the center of the property. On the west central side is a grove of cottonwood trees. Road development to the NOAA building was already improved as a gravel crown and ditched road prior to any oil and gas development. Additional sand trails with some graveling surface materials have been created for access to the oil and gas wells and facilities. The original disturbance from previous well developments has good interim reclamation and vegetative recovery. The existing road network consists of drive around loops at the well heads, and slightly larger drive areas around the 4 centralized facility sites.

The general area description would be defined as rural farmland and ranchland south of the South Platte River. There are few county roads in the project area and a state highway nearby. Most access is limited to private landowner or oil and gas developed roadways. The roadways vary in development but most are dirt/primitive roads.

Extensive oil and gas development has occurred in the nearby Wattenberg field, mostly on private mineral estate.

Finally, because the proposed action location is within an ozone nonattainment area, a general conformity analysis for ozone will be completed for the proposed activity. Potential emissions of VOCs and NOx will be calculated in order to determine their conformity with the applicable laws and statutes.

2.2 ALTERNATIVES ANALYZED IN DETAIL

2.2.1 Proposed Action

The proposed action is to construct 4 well pads, 2 facility pads, and pipelines in order to drill and develop federal minerals from a federal surface. Permanent electrical power will also be required for operations on each of the pads and the production pads. In order to meet this requirement, the operator will install underground power lines from the North West corner of section 36, along the existing access roads to each of the pads. All of the related surface disturbance would be within 10 feet of existing roadways, whose construction was analyzed in the Environmental Assessment CO-050-88-NE-07 and amendment CO-050-89-NE-19. Access to the proposed well and facility pads would be gained by traveling on existing county and rural roads. All construction activities will be, at least in part, on previously disturbed but in most cases reclaimed surface. There are producing oil and gas wells and related equipment currently occupying all of the proposed pads. The operator is proposing to expand the existing well pads in order to accommodate well drilling and completion equipment. Once the wells are drilled and completed, the pads would be reclaimed according to gold book standards, and reduced to a smaller size required for the production phase.

The proposed projects are located in the central part of Weld County, 17 miles south of the City of Greeley, Colorado. The mineral estate within the project boundary is leased and subject to oil and gas development.

Proposed well pad #1 containing the **USA Fed 04N-36HZ, USA Fed 29N-36HZ, and USA Fed 30C-36HZ** would have a maximum cut of 6.45 feet and a maximum fill of 8.35 feet. The proposed construction would disturb 5,890 cubic yards of top soil at a 6" depth. Part of the construction will require "platting" of the ground surface, which entails the use of clay soils on the pad surface in order to achieve compaction necessary to accommodate drilling equipment. The plating material would be acquired from a commercial source, brought to the site, and subsequently removed as part of interim reclamation. Construction of the well pad would result in approximately 9.5 acres of new and previously disturbed surface disturbance, which would be reduced after successful interim reclamation. Left over top and sub soil piles not used in the interim reclamation will be protected in order to prevent erosion. No new access road construction will be required. The proposed drilling and completion will utilize a closed loop system, no reserve or storage pit is being proposed. Facilities for this well would not be located on the well pad itself, but rather on a nearby central tank battery.

Proposed well pad #2 containing the **USA Fed 29C-36HZ, USA Fed 03N-36HZ, and USA Fed 28N-36HZ** would have a maximum cut of 7.9 feet and a maximum fill of 7.2 feet. The proposed construction would disturb 6,666 cubic yards of top soil at a 6" depth. Part of the construction will require "platting" of the ground surface, which entails the use of clay soils on the pad surface in order to achieve compaction necessary to accommodate drilling equipment. The plating material would be acquired from a commercial source, brought to the site, and subsequently removed as part of interim reclamation. Construction of the well pad would result in approximately 9.5 acres of new and previously disturbed surface disturbance, which would be reduced after successful interim reclamation. Left over top and sub soil piles not used in the interim reclamation will be protected in order to prevent erosion. No new access road construction will be required. The proposed drilling and completion will utilize a closed loop system, no reserve or storage pit is being proposed. Facilities for this well would not be located on the well pad itself, but rather on a nearby central tank battery.

Proposed well pad #3 containing the **USA Fed 02N-36HZ, USA Fed 02C-36HZ, and USA Fed 27N WEST-36HZ** would have a maximum cut of 12.1 feet and a maximum fill of 8.9 feet. The proposed construction would disturb 6,666 cubic yards of top soil at a 6" depth. Part of the construction will require "platting" of the ground surface, which entails the use of clay soils on the pad surface in order to achieve compaction necessary to accommodate drilling equipment. The plating material would be acquired from a commercial source, brought to the site, and subsequently removed as part of interim reclamation. Construction of the well pad would result in approximately 9.5 acres of new and previously disturbed surface disturbance, which would be reduced after successful interim reclamation. Left over top and sub soil piles not used in the interim reclamation will be protected in order to prevent erosion. No new access road construction will be required. The proposed drilling and completion will utilize a closed loop system, no reserve or storage pit is being proposed. Facilities for this well would not be located on the well pad itself, but rather on a nearby central tank battery.

Proposed well pad #4 containing the **USA Fed 01N-36HZ, USA Fed 26C-36HZ, and USA Fed 27N East-36HZ** would have a maximum cut of 6.3 feet and a maximum fill of 3.4 feet. The proposed construction would disturb 6,666 cubic yards of top soil at a 6" depth. Part of the construction will require "platting" of the ground surface, which entails the use of clay soils on

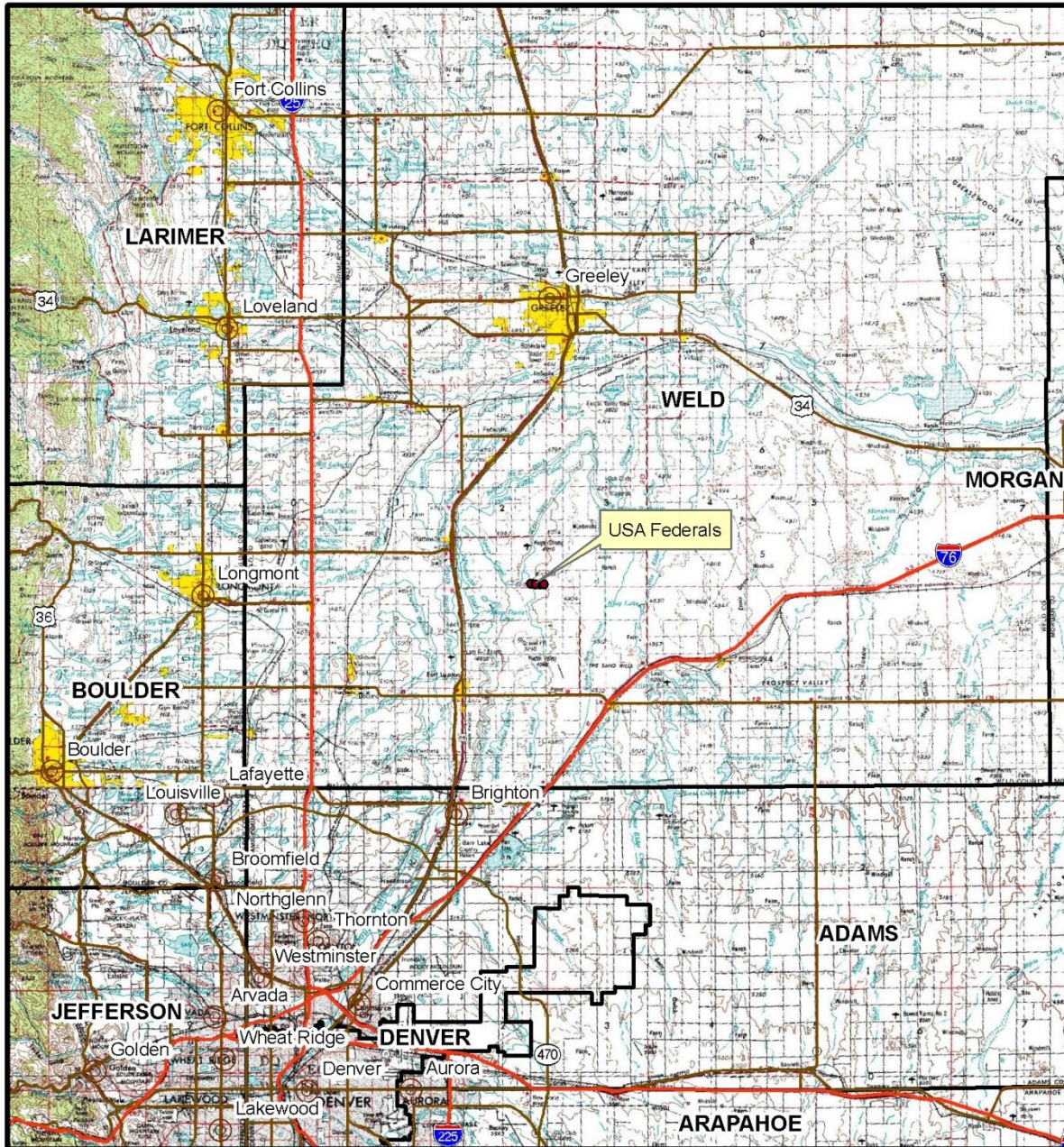
the pad surface in order to achieve compaction necessary to accommodate drilling equipment. The plating material would be acquired from a commercial source, brought to the site, and subsequently removed as part of interim reclamation. Construction of the well pad would result in approximately 9.5 acres of new and previously disturbed surface disturbance, which would be reduced after successful interim reclamation. Left over top and sub soil piles not used in the interim reclamation will be protected in order to prevent erosion. No new access road construction will be required. The proposed drilling and completion will utilize a closed loop system, no reserve or storage pit is being proposed. Facilities for this well would not be located on the well pad itself, but rather on a nearby central tank battery.

In addition to the proposed well pad construction the operator is proposing to expand two existing tank battery pads in order to accommodate facilities for the proposed wells. Tank battery for pad #1 and #2 (west tank battery) will result 2.1 acres of total disturbance and have maximum cut of 2.8 feet. Net dirt work required for the expansion would be 15 cubic yards. Tank battery for pad #3 and #4 (east battery) will result 2.3 acres of total disturbance and have maximum cut of 4.6 feet. Net dirt work required for the expansion would be 70 cubic yards. Tank batteries would be lined and bermed to accommodate 150% the volume of the largest tank vessel.

The operator is proposing 8,008 feet of new pipeline along existing roads. The proposed pipeline would result in a 25 foot wide disturbance for an additional net total disturbance of 4.5 acres. The pipe would be buried at a 48 inch depth and the area would be reclaimed to Gold Book Standards.

In the event of a dry hole the pads and access roads will be graded to original contour, topsoil replaced and the entire area reseeded. Rehabilitation of the well pads and access roads are bonded to ensure compliance with BLM reclamation requirements. The proposed action would include well drilling and completion operations, which would take approximately 50 days for the well, and interim and final reclamation measures. The Application for Permit to Drill (APD) for each new well includes a drilling program and a multi-point surface use and operations plan that describe details of well pad construction and interim and final reclamation. The proposed action would be implemented consistent with the terms of Federal Lease COC 37842 and with Conditions of Approval (COAs) attached to the APDs.

Regional Map



DOI-BLM-CO-200-2012-0087 EA



0 2 4 8 12 16 Miles

T3N, R66W, S. 36

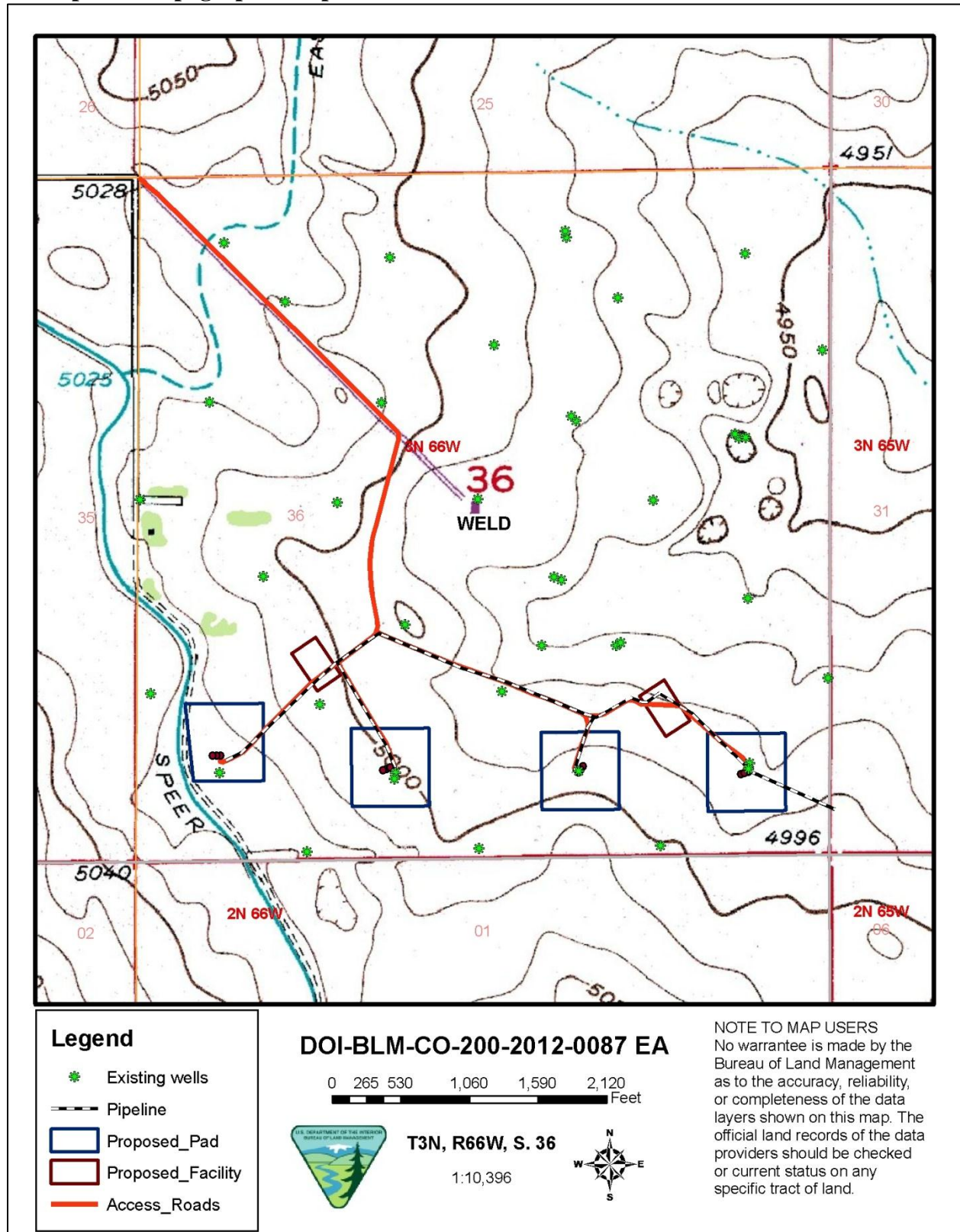
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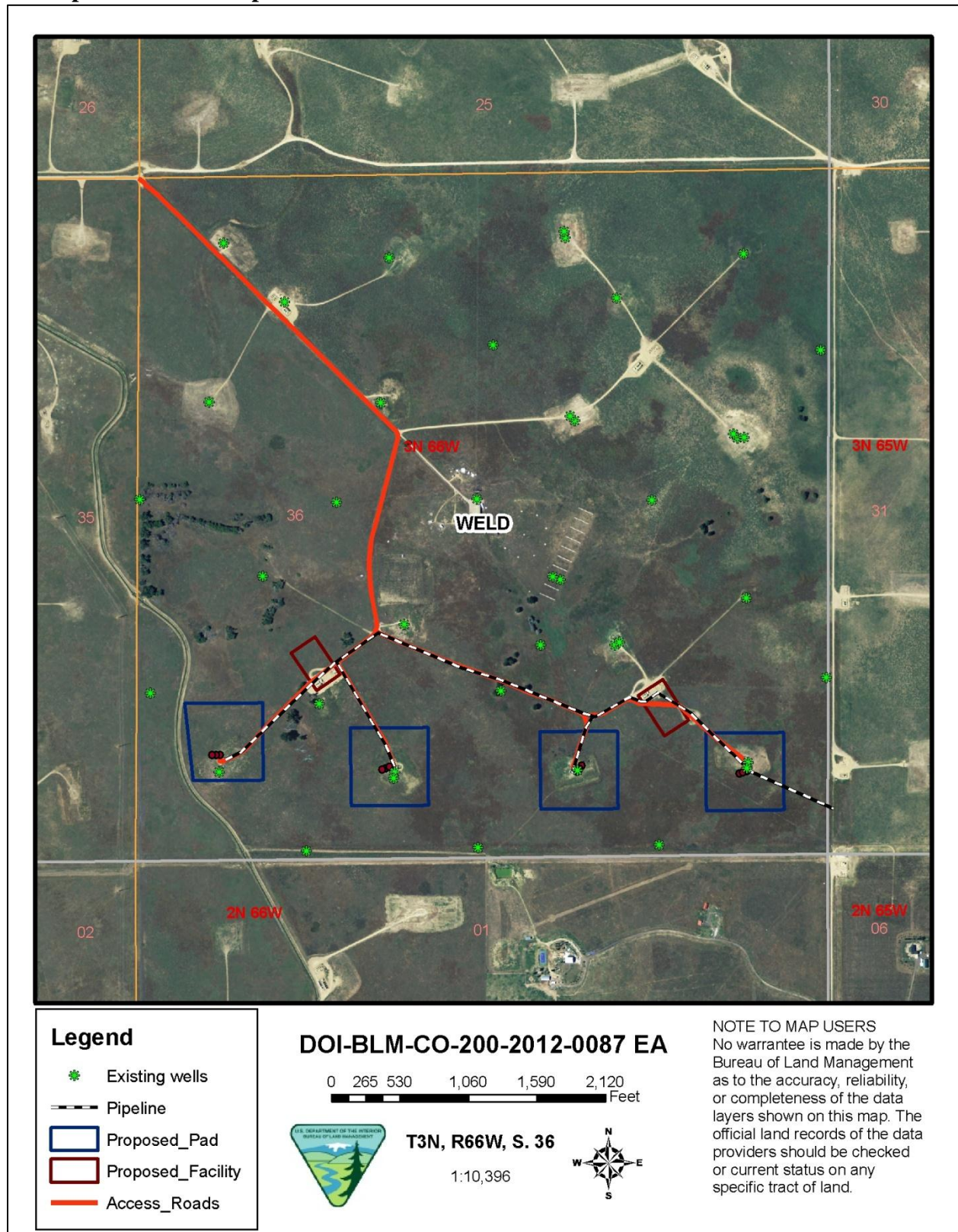
NOTE TO MAP USERS
No warrantee is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of the data layers shown on this map. The official land records of the data providers should be checked or current status on any specific tract of land.

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Sites-specific Topographic Map



Sites-specific Aerial Map



2.2.2 No Action Alternative

The proposed action involves Federal subsurface minerals that are encumbered with Federal oil and gas leases, which grant the lessee a right to explore and develop the leases. Although BLM cannot deny the right to drill and develop the leasehold, individual APDs can be denied to prevent unnecessary and undue degradation. The no action alternative constitutes denial of the APDs associated with the proposed action. Under the no action alternative, therefore, none of the proposed developments described in the proposed action would take place.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Other alternatives were not considered due to the proposed project being a non-discretionary action being proposed on private (NOAA?) surface.

CHAPTER 3 - AFFECTED ENVIRONMENT AND EFFECTS

3.1 INTRODUCTION

This section provides a description of the human and natural environmental resources that could be affected by the Proposed Action and presents comparative analyses of the direct, indirect and cumulative effects on the affected environment stemming from the implementation of the actions under the Proposed Action and other alternatives analyzed.

3.1.1 Interdisciplinary Team Review

The following table is provided as a mechanism for resource staff review, to identify those resource values with issues or potential impacts from the proposed action and/or alternatives. Those resources identified in the table as potentially impacted will be brought forward for analysis.

<u>Resource</u>	<u>Initial and date</u>	<u>Comment or Reason for Dismissal from Analysis</u>
<u>Air Quality</u> <i>Ty Webb, Chad Meister, Melissa Hovey</i>	CM, 4/3/13	See affected environment
<u>Geology/Minerals</u> <i>Stephanie Carter, Melissa Smeins</i>	MJS, 1/14/2013	See affected environment
<u>Soils</u> <i>John Smeins</i>	TK, 7/8/12	All infrastructure (roads, drill pads, etc.) being proposed, would be built and reclaimed according to BLM Gold Book standards unless otherwise stipulated by the surface owner.
<u>Water Quality</u> <u>Surface and Ground</u> <i>John Smeins</i>	JS, 12/11/12	See Water Quality section.

<u>Resource</u>	<u>Initial and date</u>	<u>Comment or Reason for Dismissal from Analysis</u>
<u>Invasive Plants</u> <i>John Lamman</i>	JL, 03/22/2013	See affected environment.
<u>T&E and Sensitive Species</u> <i>Matt Rustand</i>	MR, 12/3/12	No T&E species or habitats are located within the action area. The ferruginous hawk, a BLM sensitive species, may be found in this habitat type.
<u>Vegetation</u> <i>Jeff Williams, Chris Cloninger, John Lamman</i>	JL, 03/22/2013	Vegetation in the project area is mid-grass prairie with scattered low shrubs. Impacts are expected to be minor.
<u>Wetlands and Riparian</u> <i>Dave Gilbert</i>	DG, 12/26/12	Proposed action is within upland rangelands.
<u>Wildlife Aquatic</u> <i>Dave Gilbert</i>	DG, 12/26/12	Proposed action is within uplands.
<u>Wildlife Terrestrial</u> <i>Matt Rustand</i>	MR, 12/3/12	See affected environment
<u>Migratory Birds</u> <i>Matt Rustand</i>	MR, 12/3/12	See affected environment.
<u>Cultural Resources</u> <i>Monica Weimer, Erin Watkins</i>	MMW, 4/1/13	If Pad #1 (the westernmost) is limited to the east side of the ditch, no historic properties will be affected [Reports CR-RG-89-43 (P), CR-RG-07-76 (P), CR-RG-07-80 (P)].
<u>Native American Religious Concerns</u> <i>Monica Weimer, Erin Watkins</i>	MMW, 4/1/13	No concerns.
<u>Economics</u> <i>Dave Epstein, Martin Weimer</i>	AR, 3/20/12	The setting for the oil and gas well is rural in nature, being located on NOAA research property. Economics would primarily affect only the Federal Government and the oil and gas operator. The action will not result in significant impacts to the socio economics of the region.
<u>Paleontology</u> <i>Melissa Smeins, Stephanie Carter</i>	MJS, 1/14/13	See affected environment
<u>Visual Resources</u> <i>Kalem Lenard</i>	KL, 12/4/12	The project is within a highly modified environment with existing structures and wells and would not impact visual resources.
<u>Environmental Justice</u> <i>Martin Weimer</i>	mw, 4/3/13	The proposed action affects areas that are rural in nature. The land adjacent to the well site is grassland, as a result, there are no minority or low-income populations in or near the project area. As such, the proposal will not have a disproportionately high or adverse environmental effect on minority or low-income populations.
<u>Wastes Hazardous or Solid</u> <i>Stephanie Carter</i>	MJS, 1/14/13	See affected environment
<u>Recreation</u> <i>Kalem Lenard</i>	KL, 12/4/12	Not Present

<u>Resource</u>	<u>Initial and date</u>	<u>Comment or Reason for Dismissal from Analysis</u>
<u>Farmlands Prime and Unique</u> <i>Jeff Williams, Chris Cloninger, John Lamman</i>	JL, 12/17/12	Not Present
<u>Lands and Realty</u> <i>Steve Craddock, Vera Matthews</i>		N/A
<u>Wilderness, WSAs, ACECs, Wild & Scenic Rivers</u> <i>Kalem Lenard</i>	KL, 8/14/12	Not Present
<u>Wilderness Characteristics</u> <i>Kalem Lenard</i>	KL, 8/14/12	Not Present
<u>Range Management</u> <i>Jeff Williams, Chris Cloninger, John Lamman</i>	JL, 12/17/12	Not Present
<u>Forest Management</u> <i>Ken Reed</i>	KR, 12/3/12	Not Present
<u>Cadastral Survey</u> <i>Jeff Covington</i>	JC, 9/7/12	COS is attached in the project folder.
<u>Noise</u> <i>Martin Weimer</i>	mw, 4/3/13	The project area is located in grassland. Certain levels of noise are associated with drilling operations, these include drill rig operation, compressors/generators and general machine and vehicle operation. These impacts are temporary and terminate when drilling operations are complete.
<u>Fire</u> <i>Bob Hurley</i>		N/A
<u>Law Enforcement</u> <i>Steve Cunningham</i>		N/A

The affected resources brought forward for analysis include:

- Air quality
- Geology/Minerals
- Water Quality
- Soils
- Invasive Plants
- Vegetation
- Wildlife Terrestrial
- Migratory Birds
- Paleontology

- Wastes Hazardous or Solid

3.2 PHYSICAL RESOURCES

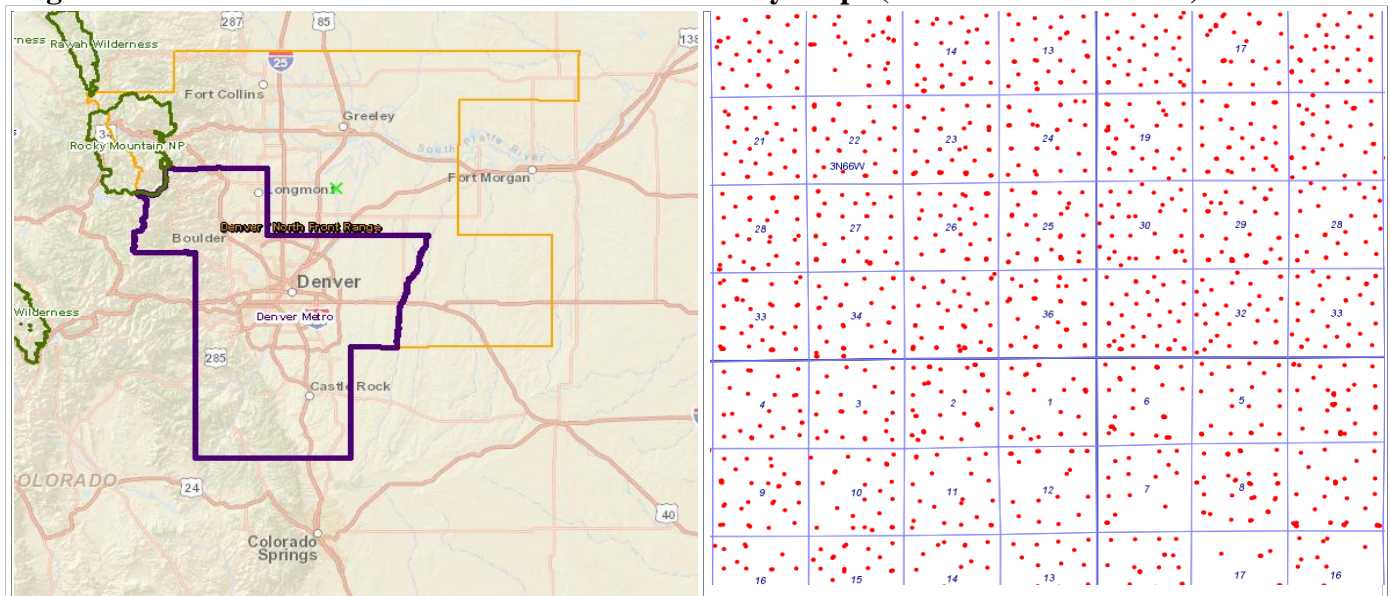
3.2.1 AIR QUALITY AND CLIMATE

Affected Environment: The proposed action area (Northern Weld County) is predominantly used for agriculture. Approximately 75% of the available land area of Weld County is linked to the agricultural sector of the economy in one form or another. Oil and gas development is another major economic driver for the area, and Weld County has some 17,000 active wells within its boundaries.

Air quality within the region is marginal, and has experienced problems with attaining the National Ambient Air Quality Standards in the past for Ozone and Carbon Monoxide. The population density of Weld County within the proposed action area is generally dispersed, with less than 25 people per square mile. Mean temperatures in the area range from 15.6 degrees in January to 88.7 degrees in July. The area receives average annual precipitation of approximately 14.22 inches. Frequent winds in the area provide excellent dispersion characteristics for anthropogenic emissions.

Activities occurring within the area that affect air quality include exhaust emission from cars, drilling rigs, agricultural equipment, and other vehicles, and oil and gas development activities, as well as fugitive dust from roads, agriculture, and energy development.

Figure 3-1. CDPHE & COGCC GIS Location Boundary Maps (12 USA Federal Wells)



1 Air Quality Designations are outlined as follows: Yellow – 8 hr. O3 Non-attainment Area, Purple – PM10 Maintenance Area, Red – CO Maintenance Area. 12 USA Federal Location depicted by green 'X' on APCD map.

2 Class 1 areas are outlined in green.

3 Red dots on COGCC map depict well locations all around 3N66W Sec. 36 (12 USA Federal Well locations)

Regulatory Framework: The Clean Air Act (CAA), which was last amended in 1990, requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) (40 CFR part 50) for criteria pollutants. Criteria pollutants are air contaminants that are commonly emitted from the majority of emissions sources and include carbon monoxide (CO), lead (Pb), sulfur dioxide (SO₂), particulate matter smaller than 10 & 2.5 microns (PM₁₀ & PM_{2.5}), ozone (O₃), and nitrogen dioxide (NO₂).

The CAA established 2 types of NAAQS:

Primary standards: – Primary standards set limits in order to protect public health, including the health of "sensitive" populations (such as asthmatics, children, and the elderly).

Secondary standards: – Secondary standards set limits in order to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings.

The EPA regularly reviews the NAAQS (every five years) to ensure that the latest science on health effects, risk assessment, and observable data such as incidence rates are evaluated in order to re-propose any NAAQS to a lower limit if the data supports the finding. The Colorado Air Pollution Control Commission, by means of an approved State Implementation Plan (SIP) and/or delegation by EPA, can establish state ambient air quality standards for any criteria pollutant that is at least as stringent as, or more so, than the federal standards. Ambient air quality standards must not be exceeded in areas where the general public has access. Table 3.1 lists the federal and state ambient air quality standards.

Table 3-2. Ambient Air Quality Standards (EPA 2011)

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3 month average	0.15 µg/m ³	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb	Annual Mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution [Dec 14, 2012]	PM _{2.5}	primary and secondary	Annual	12 µg/m ³	Annual mean, averaged over 3 years
			24-hour	35 µg/m ³	98th percentile, averaged over 3 years
	PM ₁₀	primary and secondary	24-hour	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years

Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]	primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	primary	Annual	0.03 ppm	Arithmetic Average
	secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

The nearest APCD air monitors to the project sites are the Weld County West Annex (CO), County Tower (O₃), and Hospital (PM₁₀ & PM_{2.5}) sites located in Greeley, and the Platteville Middle School site (PM_{2.5}).

Table 3-1. Ambient Air Quality Monitoring Data Trends (CDPHE 2007 – 2010, EPA Forms)

Monitor	Pollutant (Standard)	2007	2008	2009	2010
West Annex	CO (1 Hour - ppm)	4.0	5.0	4.3	2.3
	CO (8 Hour - ppm)	2.5	2.3	2.3	1.8
County Tower	O ₃ (8 Hour - ppm)	0.078	0.076	0.075	0.074
Hospital	PM ₁₀ (24 Hour - µg/m ³)	89	68	63.0	44.0
	PM _{2.5} (24 Hour - µg/m ³)	24.0	25.2	24.7	22.0
	PM _{2.5} (Annual - µg/m ³)	9.5	7.67	8.36	7.6
Platteville	PM _{2.5} (24 Hour - µg/m ³)	24.0	25.2	25.7	21.1
	PM _{2.5} (Annual - µg/m ³)	10.3	8.23	8.24	7.8

The CAA and the Federal Land Policy and Management Act of 1976 (FLPMA) require BLM and other federal agencies to ensure actions taken by the agency comply with federal, state, tribal, and local air quality standards and regulations. FLPMA further directs the Secretary of the Interior to take any action necessary to prevent unnecessary or undue degradation of the lands [Section 302 (b)], and to manage the public lands “in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values” [Section 102 (a)(8)].

The BLM, as the federal entity with jurisdiction for the subject activity, is bound by the requirements of the General Conformity rule under section 176(c) of the Clean Air Act for authorizing activities within a designated nonattainment or maintenance air quality area/region. The subject activity will be located within the Denver-metropolitan and North Front Range Ozone Nonattainment Area (Marginal), and thus a positive General Conformity demonstration or non-applicability analysis is required before the BLM can authorize the applicant’s permit to drill. This process ensures that a Federal action conforms to a State, Tribal, or Federal Implementation Plan. The proposed wells are not located within the North Front Range CO or PM₁₀ maintenance areas, and therefore conformity analysis requirements for those pollutants do not apply. Emissions estimates for direct and indirect Oxides of Nitrogen (NO_x) and Reactive Volatile Organic Compounds (VOC), precursors for the formation of ground level ozone, was prepared for reasonably foreseeable oil and gas development activities for the well sites, and includes emissions from construction, production, and maintenance operations. 40 CFR 93.153 defines the *de minimis* thresholds for NO_x and VOC in a marginal or moderate ozone nonattainment area, and outside of any designated transport region, as 100 tons per year (tpy). The subject activity is scheduled to commence in the fall of 2013, with the construction phase lasting approximately 3-6 months. The life of

the well, if economically viable, would be expected to sustain operations for approximately 20 – 30 years once production begins. Maximum foreseeable direct and indirect emissions would occur at the beginning of the project in 2013 (see results below).

The lease area is designated as a Class II Area, as defined by the Federal Prevention of Significant Deterioration (PSD) provision of the CAA. The PSD Class II designation allows for moderate growth or degradation of air quality within certain limits above baseline air quality. The closest Class I area to the proposed well site locations is Rocky Mountain National Park, which lies approximately 68 miles to the west.

Environmental Effects:

Proposed Action (Direct and Indirect Impacts): The proposed action will have a temporary negative impact to air quality which will mostly occur during the construction phase. Utilization of the access road, surface disturbance, and construction activities such as drilling, hydraulic fracturing, well completion, and equipment installation will all impact air quality through the generation of dust related to travel, transport, and general construction. This phase will also produce short term emissions of criteria, hazardous, and greenhouse gas pollutants from vehicle and construction equipment exhausts. Once construction is complete the daily activities at the site will be reduced to operational and maintenance checks which may be as frequent as daily visits. Emissions will result from vehicle exhausts from the maintenance and process technician visits, as well as oil and produced water collection or load out trips. The pads can be expected to produce fugitive emissions of well gas and liquid flashing gases, which can contain a mixture of methane, volatile organic compounds, and inert or non-regulated gases. Fugitive emissions may result from pressure relief valves and working and breathing losses from any tanks located at the sites, as well as any flanges, seals, valves, or other infrastructure connections used at the sites. Liquid product load-out operations will also generate fugitive emissions of VOCs.

Ozone is not directly emitted like other criteria pollutants. Ozone is chemically formed in the atmosphere via interactions of oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight and under certain meteorological conditions (NO_x and VOCs are ozone precursors). Ozone formation and prediction is complex, generally results from a combination of significant quantities of VOCs and NO_x emissions from various sources within a region, and has the potential to be transported across long ranges. Therefore, it is typically not appropriate to assess (i.e. model) potential ozone impacts of a minor project on potential regional ozone formation and transport. However, the State of Colorado assesses potential ozone impacts from its authorizing activities on a regional basis when an adequate amount of data is available and where such analysis has been deemed appropriate. For this reason (inappropriate scale of analysis), ozone will not be further addressed in this document beyond the related precursor discussions, general conformity analysis, and an appropriate qualitative analysis/comparison to background emissions inventories for the county and SIP (see cumulative impacts).

Emission estimates from the proposed well sites were calculated for this EA, and are disclosed in Table 3.2 and 3.3 below. The emissions inventories (EI) considered reasonably foreseeable oil and gas development activities for the proposed wells within the Denver-metropolitan Northern Front Range Nonattainment Area, and includes emissions from both construction and production operations. The

following pollutants were inventoried where an appropriate basis, methodology, and sufficient data exists: CO, NO_x (includes NO₂), PM_{2.5}, PM₁₀, SO₂, VOCs, HAPs, CO₂, CH₄, and N₂O. The EI was developed using reasonable but conservative scenarios for each activity. Production emissions were calculated based on full production activity for the entire year (2014). Potential emissions were calculated for each well assuming the minimum/basic legally required control measures, site specific voluntary operator controls, operational parameters, and equipment configurations data that was provided by the applicant.

The following assumptions were applied consistently to all potential activities:

- Given the lack of reasonably foreseeable activity on existing roads (lack of location, timing, activity volume, and types of vehicles), it was assumed current vehicular emissions would continue indefinitely, and at minimum would conform to growth outlined in the Draft (07/28/11) Denver-North Front Range (Northern Subarea) 8-Hour Ozone Conformity Determination. Although some or all of the traffic associated with this action would be included within the above reference conformity determination, no credit was taken to exclude vehicular traffic emissions from this analysis.
- The EI used a disturbed surface area of 3.4 acres on a per well basis (includes pad and gather system infrastructure).
- All disturbed surfaces (pads and access roads) would receive appropriate application of water (during construction) or dust palliatives (during operations), but were calculated to achieve a 0 % dust control factor to be conservative.
- All diesel fuel would be standard #2 grade (500 ppm sulfur) or better.
- Equipment would include tanks, separation equipment, and artificial lift engines, but no dehydration or desulfurization units.
- 'Natural gas' would be piped directly into a 3rd party gathering system. Completion flaring would be limited due to the implementation of 'Green Completions'.
- Drill rigs emissions were based on EPA Non-road Tier 2 emissions standards.
- The EI used an applicant provided 'Well Gas' ultimate analysis to estimate VOC and HAP speciation percentages.
- Fugitive well emissions are based on an applicant provided well component counts.
- No New Source Review (minor) credit was taken (i.e. all emissions estimates are included in the analysis) for project stationary sources likely to receive permitting from APCD.

Table 3-2. Estimated Maximum Annual Emissions (2013) from 12 USA Federal Wells

Activity	Annual Emissions 2013 (tons)												
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs	H ₂ S	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	0.91	0.09	---	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Exhaust Emissions	1.64	1.59	59.54	2.40	15.13	2.90	0.29	---	7,835.45	0.44	0.20	7,906.19	7,174.40
Commuting Vehicles - Construction	3.85	0.72	5.95	0.02	1.72	0.30	0.03	---	87.99	0.00	0.00	88.04	79.89
Wind Erosion	0.78	0.12	---	---	---	---	---	---	---	---	---	---	---
Completion Venting (100% Green)	---	---	---	---	---	2.86	0.34	0.00	2.57	3.18	0.00	69.27	62.86
Sub-total: Construction	7.19	2.52	65.49	2.43	16.86	6.06	0.66	0.00	7,926.01	3.62	0.20	8,063.50	7,317.15
Well Workover Operations - Fugitive Dust	0.01	0.00	---	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - Exhaust	0.00	0.00	0.05	0.00	0.02	0.00	0.00	---	10.49	0.00	0.00	10.57	9.59
Wellpad Visits for Inspection & Repair	0.05	0.01	0.01	0.00	0.05	0.00	0.00	---	3.02	0.00	0.00	3.04	2.76
Wellhead and Compressor Equipment Leaks	---	---	---	---	---	10.16	1.09	0.00	67.75	88.43	0.00	1,924.73	1,746.58
Wellhead Compressor Engines Exhaust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Oil Wellhead Pumps (Artificial Lift)	0.86	0.86	13.69	0.01	16.03	0.55	0.05	---	2,303.79	0.02	0.02	2,311.65	2,097.69
Condensate Storage	---	---	---	---	---	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Condensate Related Traffic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Oil Tanks	---	---	---	---	---	0.61	0.03	---	0.07	0.00	0.00	0.07	0.07
Oil Related Traffic	0.03	0.01	0.15	0.00	0.04	0.01	0.00	---	19.95	0.00	0.00	19.96	18.11
Water Tanks	---	---	---	---	---	0.61	0.07	---	0.00	0.07	0.00	1.53	1.39
Water Related Traffic	0.21	0.02	0.03	0.00	0.01	0.00	0.00	---	3.81	0.00	0.00	3.81	3.46
Water Disposal Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Well Pad Heaters	0.00	0.00	0.05	0.00	0.04	0.00	0.00	---	59.73	0.00	0.00	60.09	54.53
Recompletion Traffic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Re-Completion Venting	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown Venting	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gas Flaring	---	---	0.00	---	0.03	0.01	---	---	6.17	0.04	---	7.07	6.42
Gas Plant Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6,862.65	0.13	0.01	6,869.38	6,233.56
Field Dehydrators	---	---	0.00	---	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Sub-total: Operations	1.16	0.91	13.98	0.02	16.21	11.95	1.24	0.00	2,474.76	88.57	0.03	4,342.52	3,940.58
Resource Road Maintenance	0.09	0.01	0.04	0.00	0.01	0.00	0.00	---	5.32	0.00	0.00	5.36	4.86
Sub-total: Maintenance	0.09	0.01	0.04	0.00	0.01	0.00	0.00	0.00	5.32	0.00	0.00	5.36	4.86
Resource Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Wellpad Reclamation	0.04	0.01	0.10	0.00	0.08	0.01	0.00	---	11.47	0.00	0.00	11.56	10.49
Sub-total: Reclamation	0.04	0.01	0.10	0.00	0.08	0.01	0.00	0.00	11.47	0.00	0.00	11.56	10.49
Total Emissions (tons)	8.48	3.45	79.62	2.45	33.16	18.04	1.90	0.00	10,417.56	92.19	0.22	12,422.94	11,273.08

Table 3-3. Estimated Maximum Annual Emissions (2014) from 12 USA Federal Wells

Activity	Annual Emissions 2014 (tons)												
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs	H ₂ S	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	0.30	0.03	---	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Exhaust Emissions	0.55	0.53	19.85	0.80	5.04	0.97	0.10	---	2,611.82	0.15	0.07	2,635.40	2,391.47
Commuting Vehicles - Construction	1.28	0.24	1.98	0.01	0.57	0.10	0.01	---	87.99	0.00	0.00	88.04	79.89
Wind Erosion	0.26	0.04	---	---	---	---	---	---	---	---	---	---	---
Completion Venting (100% Green)	---	---	---	---	---	0.95	0.11	0.00	0.86	1.06	0.00	23.09	20.95
Sub-total: Construction	2.40	0.84	21.83	0.81	5.62	2.02	0.22	0.00	2,700.66	1.21	0.07	2,746.52	2,492.31
Well Workover Operations - Fugitive Dust	0.01	0.00	---	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - Exhaust	0.00	0.00	0.06	0.00	0.02	0.00	0.00	---	11.00	0.00	0.00	11.08	10.06
Wellpad Visits for Inspection & Repair	0.07	0.01	0.01	0.00	0.06	0.00	0.00	---	4.02	0.00	0.00	4.05	3.67
Wellhead and Compressor Equipment Leaks	---	---	---	---	---	10.16	1.09	0.00	90.33	117.90	0.00	2,566.31	2,328.78
Wellhead Compressor Engines Exhaust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Oil Wellhead Pumps (Artificial Lift)	1.15	1.15	18.25	0.02	21.38	0.73	0.07	---	3,071.71	0.03	0.03	3,082.20	2,796.91
Condensate Storage	---	---	---	---	---	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Condensate Related Traffic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Oil Tanks	---	---	---	---	---	0.61	0.03	---	0.07	0.00	0.00	0.07	0.07
Oil Related Traffic	0.03	0.01	0.15	0.00	0.04	0.01	0.00	---	19.95	0.00	0.00	19.96	18.11
Water Tanks	---	---	---	---	---	0.61	0.07	---	0.00	0.07	0.00	1.53	1.39
Water Related Traffic	0.21	0.02	0.03	0.00	0.01	0.00	0.00	---	3.81	0.00	0.00	3.81	3.46
Water Disposal Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Well Pad Heaters	0.00	0.00	0.05	0.00	0.04	0.00	0.00	---	59.73	0.00	0.00	60.09	54.53
Recompletion Traffic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Re-Completion Venting	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blowdown Venting	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gas Flaring	---	---	0.00	---	0.03	0.01	---	---	6.17	0.04	---	7.07	6.42
Gas Plant Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6,862.65	0.13	0.01	6,869.38	6,233.56
Field Dehydrators	---	---	0.00	---	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Sub-total: Operations	1.47	1.19	18.55	0.02	21.57	12.14	1.26	0.00	3,266.79	118.06	0.03	5,756.18	5,223.39
Resource Road Maintenance	0.12	0.01	0.06	0.00	0.02	0.00	0.00	---	7.09	0.00	0.00	7.15	6.48
Sub-total: Maintenance	0.12	0.01	0.06	0.00	0.02	0.00	0.00	0.00	7.09	0.00	0.00	7.15	6.48
Resource Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00
Wellpad Reclamation	0.05	0.02	0.14	0.00	0.11	0.02	0.00	---	15.30	0.00	0.00	15.41	13.98
Sub-total: Reclamation	0.05	0.02	0.14	0.00	0.11	0.02	0.00	0.00	15.30	0.00	0.00	15.41	13.98
Total Emissions (tons)	4.04	2.07	40.58	0.83	27.31	14.18	1.48	0.00	5,989.84	119.26	0.10	8,525.25	7,736.17

Table 3-4 below demonstrates a relative comparison of the project emissions to Weld County's total emissions from 2008. It also shows Weld County's oil and gas area and point source emissions for the same period.

Table 3-4. Proposed Action & Weld County Emissions Comparisons¹

Pollutant	Emissions, Tons per year (Max)			
	12 USA Federal Wells	Weld County Total Emissions (2008)	Weld County Oil & Gas Area Source Emissions	Weld County, Oil & Gas Point Source Emissions
NO _x	70.7	29,295	7,763	5,910
CO	29.4	74,544	4,968	5,138
VOC	17.3	82,714	30,810	21,580
PM ₁₀	35.6	40,718	375	129
PM _{2.5}	7.1	ND	ND	ND
SO _x	2.2	474	ND	4
HAPs	1.8	242	ND	66

¹ CDPHE 2008 APEN Database/Emissions Inventory (most current available). ND = No Data. CDPHE HAP inventory is for benzene only.

The APD projects, as designed and submitted, have been evaluated in accordance with the requirements of 40 CFR 93.153 subpart B and have been found to conform for the following reason(s):

12 USA Federal Wells:

- [X] Potential maximum total Direct and Indirect emissions are below *de minimis* threshold levels:
Ozone (NO_x): 70.7 tpy in 2013 (Maximum Year)
Ozone (VOC): 17.3 tpy in 2013 (Maximum Year)

The project emissions are relatively small compared to the aggregate County emissions, less than 0.2%. APCD published modeling guidance (Colorado Modeling Guideline for Air Quality Permits - January 2002, April 2010) that established thresholds for requiring additional analysis when emissions are exceeded on an annual or short term basis. The modeling thresholds were developed to identify new sources and modifications that would have relatively small impacts on ambient air quality and would not warrant further analysis with respect to applicable standards with a few exceptions. The thresholds (de minimis emissions) establish levels of emissions which have a low probability of causing or contributing to an exceedance of an air quality standard. The annual production phase calculated emissions are below the APCD established thresholds, and the short-term production phase estimated emissions are considered to be insignificant due to the spatial distribution of emissions sources associated with the project and the dispersion characteristics of these sources (i.e. NO_x and particulate matter [PM] emissions originate from well pad and traffic combustion sources that are spread throughout the 1 square mile project area). However, construction phase related NO_x emissions are much higher than the applicable modeling threshold and due to the short-term temporal nature of project construction related activities, PM associated with construction activities warrant additional impacts analyses for these pollutants. For these reasons, a near-field ambient air quality impact assessment was performed to quantify and evaluate maximum short-term NO₂ and PM pollutant impacts within the vicinity of the

project area resulting from construction and production emissions. Appendix A provides additional information for the near-field impacts assessment conducted for this EA.

Greenhouse Gas Emissions and Climate Change: According to the U.S. Global Change Research Program (2009), global warming is unequivocal, and the global warming that has occurred over the past 50 years is primarily human-caused. Standardized protocols designed to measure factors that may contribute to climate change, and to quantify climatic impacts, are presently unavailable. Moreover, specific levels of significance have not yet been established by regulatory agencies. Predicting the degree of impact any single emitter of GHGs may have on global climate, or on the changes to biotic and abiotic systems that accompany climate change is highly complex, has considerable uncertainty, and requires intense computer modeling (i.e., super computers). As such, no readily available tools exist to predict impacts a project's emissions would have on the global, regional, or local climate. This analysis is therefore limited to comparing the context of total project GHG emissions, and to emissions recently analyzed by EPA. The analysis also discloses readily available information regarding expected changes to the global climatic system and any empirical evidence of climate change that has occurred to date (see cumulative impacts).

The implementation of the Proposed Action Alternative is estimated to contribute 11,049 tons of carbon dioxide equivalent (CO₂(e)) in the maximum year (2013). Annual operating GHG emissions will be 47% of the total emissions shown for the maximum year. Over the 25 year project timeframe the total GHG emissions expected are approximately 149,412 tons. The total provided does not account for the ultimate use or consumption of any produced minerals at this time due to the fact that the ultimate form of use and any additional processing required to render the product to sufficient quality (which would cause changes to the quantity of product) cannot be predicted with any reasonable certainty. Additionally, it should be noted that production values (also estimated at this time) could vary significantly over the life of the project, making any prediction of the quantities of GHG emitted highly speculative.

In 2007, the state of Colorado's GHG emissions were 124,000,000 metric tons. The proposed action's GHG emissions represent about 0.0081 % of the state of Colorado's GHG emissions. Given the relative magnitude of greenhouse gas emissions associated with the development of the 12 wells as compared to the state's GHG emission levels, the GHG contribution associated with the wells is extremely small.

To provide additional context, the EPA has recently modeled global climate change impacts from a model source emitting 20% more GHGs than a 1500MW coal-fired steam electric generating plant (approx. 14,132,586 metric tons per year of CO₂, 273.6 metric tons per year of nitrous oxide, and 136.8 metric tons per year of methane). It estimated a hypothetical maximum mean global temperature value increase resulting from such a project. The results ranged from 0.00022 and 0.00035 degrees Celsius occurring approximately 50 years after the facility begins operation. The modeled changes are extremely small, and any downsizing of these results from the global scale would produce greater uncertainty in the predictions. The EPA concluded that even assuming such an increase in temperature could be downscaled to a particular location, it "would be too small to physically measure or detect", see Letter from Robert J. Meyers, Principal Deputy Assistant Administrator, Office of Air and Radiation re: "Endangered Species Act and GHG Emitting Activities (Oct. 3, 2008). The project emissions are a fraction of the EPA's modeled source and are shorter in duration, and therefore

reasonable to conclude that the project would have no measurable impact on the climate.

Table 3-5. Greenhouse Gas Emission Comparisons

Inventory Description	CO ₂ e Emissions (10 ⁶ mtpy)	Proposed Action Percentage
Colorado (2007)	124	0.0081
Total US Greenhouse Gases ¹	6,957	0.000144

¹ *Inventory of US Greenhouse Gas Emissions and Sinks: 1990–2008* (EPA 2010a) EPA Emissions

Cumulative Impacts: The area currently has a high degree of alteration in the form of agricultural fields, roads, houses, and oil and gas production. The addition of the infrastructure needed to construct and drill the additional pad and well would have a cumulative impact to the area's air quality; however, given the existing level of development in the area, the proposed well's impact would be very minor. In the long term, if economical quantities of oil and gas are found, additional wells can be expected to be drilled on Federal, State, and private lands. This could result in a larger impact to air quality in the future. However, given that the area is currently designated as a nonattainment area for ozone, the state requires additional, more stringent pollution control measures for oil and gas activities in such areas.

With respect to ozone, the current nonattainment area episodic anthropogenic emissions budget approved by the Colorado Air Quality Control Commission (December 12, 2008) for NO_x and VOCs (ozone precursors) is 334.6tpd and 425.4tpd respectively. These emissions represent reductions projected to be realized (in 2010) from the implementation of additional rules which are now a part of the Colorado Air Quality Control Regulations (AQCRs). The reductions were modeled to show progress towards attaining the ozone standard for the worst ozone days. The emissions inventory included a comprehensive speciation of point, mobile (on-road and non-road), oil and gas (point and area), and biogenic sources. The Technical Support Document (TSD) for the inventory provides the basis for the inventory and includes broad cross sections of the economy. As such, and given the projected pace of development for the inventory, it is likely that the project emissions for the 12 USA Federal wells are adequately covered and evaluated in the APCD episodic analysis. Given the likely coverage, it is not anticipated the project will have a measurable impact on regional ozone formation outside of the modeled parameters. Additionally, drilling is currently scheduled for late fall 2013, and thus will not coincide with the traditional ground level ozone formation season (i.e. summer).

With respect to GHG emissions, the following predictions were identified by the EPA for the Mountain West and Great Plains region:

- The region will experience warmer temperatures with less snowfall.
- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow will be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs will be drier.
- More frequent, more severe, and possibly longer-lasting droughts will occur.

- Crop and livestock production patterns could shift northward; less soil moisture due to increased evaporation may increase irrigation needs.
- Drier conditions will reduce the range and health of ponderosa and lodge pole pine forests, and increase the susceptibility to fire.
- Grasslands and rangelands could expand into previously forested areas.
- Ecosystems will be stressed and wildlife such as the mountain line, black bear, long-nose sucker, marten, and bald eagle could be further stressed.

If these predictions are realized as mounting evidence suggests is already occurring, there could be impacts to resources within the region. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Warmer temperatures with decreased snowfall could have an impact on a particular plant's ability to sustain itself within its current range. An increased length of growing season in higher elevations could lead to a corresponding variation in vegetation and change in species composition. These types of changes would be most significant for special status plants that typically occupy a very specific ecological niche. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened or endangered plants may be accelerated. Invasive plant species would be more likely to out-compete native species.

Increases in winter temperatures in the mountains could have impacts on traditional big game migration patterns. Due to loss of habitat, or due to competition from other species whose ranges may shift northward, the population of some animal species may be reduced. Warmer winters with less snow would impact the Canada lynx by removing a competitive advantage they have over other mountain predators. Earlier snowmelt could also have impacts on cold water fish species that occupy streams throughout the planning area. Climate change could affect seasonal frequency of flooding and alteration of floodplains, which could impact riparian conditions. More frequent and severe droughts would have impacts on many wildlife species throughout the region as well as vegetative composition and availability of livestock forage in some areas. Climate change could increase the growing season within the region, however, so longer growing season in theory would result in more forage production provided there is sufficient precipitation. Drier conditions could have severe impacts on forests and woodlands. This could leave these forests and woodlands more susceptible to insect damage and at higher risk of catastrophic wildfires. Increased fire activity and intensity would increase greenhouse gas emissions.

Protective/Mitigation Measures: Anadarko would use industry best practices, including watering, graveling, and reseeded to reduce fugitive dust emissions from vehicular traffic and disturbed surfaces. Interim reclamation and existing agricultural practices will be implemented in order to stabilize the site and prevent fugitive dust from being generated. In addition the following BLM requirements will apply:

- Process equipment will be permitted by CDPHE in accordance with applicable requirements and required emissions standards to limit the facility's potential to emit and provide appropriate operating, monitoring, and recordkeeping requirements.
- COA - All FRAC Pump engines will be required to meet EPA Non-Road Tier II Emissions Standards.
- The company will perform 'Green Completions' for all wells.

- COA - All Drill Rigs will be required to meet EPA Non-Road Tier II Emissions Standards for all drilling operations.

It is expected that the operator will comply with these requirements and make every effort to minimize emissions through good engineering and operating practices to the maximum extent practical.

No Action Alternative (Direct and Indirect Impacts): None of the proposed action elements would be authorized and therefore none of the potential emissions would occur. No impacts to air quality would occur. The incremental increase to global GHG burden would not happen, however it is entirely likely the predicted climatic changes will occur regardless.

Protective/Mitigation Measures: NA

3.2.2 GEOLOGIC AND MINERAL RESOURCES

Affected Environment: The proposed APD well is located in the northern part of the Denver Basin where due to new drilling and completion technologies in mudrock dominated intervals interest has been reignited in the Rocky Mountain region Niobrara play. In addition to the Niobrara Formation, historically oil and gas in the Denver Basin has been produced from Cretaceous sandstones: J-Sandstone, Codell Sandstone, Niobrara Formation, Hygiene Sandstone, and Terry Sandstone (also known informally as the Sussex and Shannon Sandstones).

In addition to oil and gas, uranium and coal resources are also found in Weld County. Uranium resources are found in the Upper Laramie Formation north of Greeley. Coal resources are found throughout the Denver Basin in the Denver Formation and the upper Laramie Formation in the Denver Basin although most of the coal resources in the Denver Basin have come from Laramie Coals.

Several sand and gravel pits have been developed within 5 miles of the proposed wells so sufficient materials should already be available for construction needs.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The proposed action would drill through the Laramie Formation that contains the uranium and coal resources to produce hydrocarbons from underlying formations. During drilling operations on the parcels, loss of circulation or problems cementing the surface casing may affect freshwater aquifer and mineral zones encountered.

Cumulative Impacts: Cumulative impacts on geology and minerals resources would primarily occur as a result of oil and gas development, which would irreversibly deplete recoverable oil and gas from the producing formations.

Mitigation/Residual Effects: Recommended Mitigation is as follows:

BLM Onshore Order #2 (OO#2) requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. A review at the Application for Permit to Drill stage includes a geologic evaluation of the potential subsurface formations that will be penetrated by the wellbore, followed by an engineering analysis of the drilling program to ensure the well construction design is adequate to protect the surface and subsurface environment, including the potential risks identified by the geologist, and all known or anticipated zones with potential risks.

BLM will require that the surface casing be run across the aquifers, and placed at least 100 feet into a formation that should not fracture or breakdown with the maximum weighting of mud that may be needed when drilling to the depth that the intermediate casing is going to be set. Before drilling an intermediate hole, the surface casing will be cemented in place to surface between the casing and the formation.

A BLM representative may be on location during the casing and cementing of groundwater-protective surface casing and other critical casing and cementing intervals constructed to isolate subsurface zones that present high risk for potential adverse impact to human health or safety or at high risk potential for environmental contamination.

A cement bond log will be required on the production casing, to ensure the quality of the cement bond between the casing and the formation. A minimum of 100 feet of cement will be required above any producing interval, or any zone of interest. Remedial cementing procedures will be required when cementing doesn't meet BLM requirements.

If the proposed project plans to utilize federal minerals in the construction of roads, pad building or for any other construction needs, then compliance with 43 CFR 3600 is required. The project proponent will need to submit an application for a mineral materials disposal with BLM, prior to any disturbance being initiated. Federal mineral materials regulations also apply to split estate (i.e. a private surface landowner could not dispose of federal mineral materials for this project, surface or subsurface, without prior authorization from the BLM).

No Action Alternative: Under the no action alternative APDs would be denied and no action would occur. Although, Federal subsurface minerals are encumbered with Federal oil and gas leases, which grant the lessee a right to explore and develop the leases.

Direct and Indirect Impacts: Not approving the APD could set up a situation in which reservoirs could not be adequately developed and public minerals could be drained by nearby private or state wells, resulting in a loss of revenue due to drainage situations that could be resolved by authorizing APDs. Drainage cases commonly occur in northeastern Colorado where land and mineral ownership patterns are complex.

Cumulative Impacts: None
Mitigation/Residual Effects: None

3.2.3 SOILS (includes a finding on standard 1)

Affected Environment:

The Weld county soil survey has identified the soil series in the proposed project area as:

Vona loamy sand, 0-3 percent slopes. The Vona component makes up 85 percent of the map unit. Slopes are 0 to 3 percent. This component is on terraces, plains. The parent material consists of alluvium and/or eolian deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R067BY024CO Sandy Plains ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 9 percent.

Environmental Effects

The proposed development could result in a small percent of increased wind erosion during initial operations of associated with construction and drilling. A high risk of windblown erosion will continue until those disturbed lands are hardened, reclaimed by vegetation cover, protected by tackifier, straw, or manure, or protected by other methods. Overall-negative effects to soil resources, such as loss of top soil resulting from wind erosion should be reduced significantly through the correct implementation of interim and final reclamation measures and the implementation of BMPs during the construction.

Proposed Action

Direct and Indirect Impacts: This action would result in up to 58.4 acres of total combined new and previously disturbed surface disturbance. Well and tank battery pad construction would require approximately 25,973 yrd³ of top soil stripped (at 6 inch depth). In the event the well is developed into a production well, the amount of long term disturbance would be approximately 1 acres well pad size per pad, and 2 acres per tank battery. This is assuming successful interim reclamation including re-contouring, seeding, and necessary stabilization. The proposed action would have a moderate to major direct impact to soils present at the construction site. Indirectly, the increased runoff from the disturbed soils could result in increased erosion and gulying down gradient. Due to the gentle slopes and construction standards being proposed impacts to soils off site would be minor.

Cumulative Impacts: The area around the proposed wells has a variety factors effecting soils including roads, housing, agriculture, and livestock grazing. The addition of the infrastructure needed to drill the pads would have an additional impact to the areas soils. In the long term, if economical quantities of oil and gas are found, additional wells can be

expected to be drilled. This could add a large amount of disturbance that could have a larger impact on soils in the future.

Mitigation/Residual Effects: After completion and/or abandonment of the wells, the soils would still be irreversibly different than they originally were. Overall, with the proposed reclamation, soil productivity would not be considerably altered if the proposed areas are abandoned. All infrastructure (roads, drill pads, etc.) being proposed, would be built to BLM Gold Book standards. No additional mitigation would be required.

No Action Alternative

Direct and Indirect Impacts: Under this alternative, there would be no new construction. There would be no direct or indirect impact to: soils, risk of increased runoff, or risk of increased erosion in the proposed project area.

Protective/Mitigation Measures: N/A

3.2.4 WATER (SURFACE AND GROUNDWATER, FLOODPLAINS) (includes a finding on standard 5)

Affected Environment: The proposed wells would be located in a dry upland setting tributary to the South Platte River with no perennial surface water nearby. Groundwater in this area consists of the Laramie Fox-Hills aquifer that is used for domestic and agricultural purposes and is generally produced from artesian wells. This aquifer can be up to 350 feet thick, although total thickness of water yielding material rarely exceeds 200 feet. The Lower Fox Hills and upper Pierre Aquifer or upper transition zone of the Pierre shale are also important water resources that should be protected, this interval occurs at depths of about 600' to 1500'. Underlying the Fox Hills is nearly 5,000 feet of Pierre Shale. There are at least 10 water wells within a one mile radius of the proposed wells with the closest being approximately ¼ mile away. The deepest water well in this area is 800 feet with several being less than 100 feet.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Surface water impacts of the proposed wells are mainly associated with the surface disturbance associated with drilling and related infrastructure after well completion. For all proposed wells, 58.4 acres would be disturbed. Much of this is existing disturbance related to the existing wells and this Proposed Action would expand on this disturbance. Most impacts to surface water from oil and gas activity is due to removal of vegetation and exposure of mineral soils. Specific impacts would be soil compaction caused by construction that would reduce the soil infiltration rates, in turn increasing runoff during precipitation events. Downstream effects of the increased runoff may include changes in downstream channel morphology such as bed and bank erosion or accretion. Due to the flat nature of the topography and infiltration rates of the soils in this area, little to no new impacts to surface water quality would result from the surface disturbance portion of drilling the proposed

wells. Additional surface water impacts could result from chemicals, or other fluids, accidentally spilled or leaked during the development process and could result in the contamination of both ground and surface waters. Best management practices would be contained in the condition of approval that would mitigate this threat.

The drilling of the proposed wells would pass through usable groundwater. Groundwater in this area is relied on for agricultural uses, as well as, domestic use. Potential impacts to groundwater resources could occur if proper cementing and casing programs are not followed. This could include loss of well integrity, surface spills, or loss of fluids in the drilling and completion process. It is possible for chemical additives used in drilling activities to be introduced into the water producing formations without proper casing and cementing of the well bore. Changes in porosity or other properties of the rock being drilled through can also result in the loss of drilling fluids. When this occurs, drilling fluids can be introduced into groundwater without proper cementing and casing. Site specific conditions and drilling practices determine the probability of this occurrence and determine the groundwater resources that could be impacted. In addition to changing the producing formations' physical properties by increasing the flow of water, gas, and/or oil around the well bore; hydraulic fracturing can also introduce chemical additives into the producing formations. Types of chemical additives used in drilling activities may include acids, hydrocarbons, thickening agents, lubricants, and other additives that are operator and location specific. These additives are not always used in these drilling activities and some are likely to be benign such as bentonite clay and sand. Concentrations of these additives also vary considerably since different mixtures can be used for different purposes in oil and gas development and even in the same well bore. If contamination of aquifers from any source occurs, changes in groundwater quality could impact springs and water wells that are sourced from the affected aquifers. Onshore Order #2 requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones.

At this stage, geologic and engineering reviews have been done to ensure that cementing and casing programs are adequate to protect all downhole resources. Known water bearing zones in the APD area are protected by drilling requirements and, with proper practices, contamination of ground water resources is highly unlikely. Casing along with cement would be extended well beyond fresh-water zones to insure that drilling fluids remain within the well bore and do not enter groundwater.

Protective/Mitigation Measures: No additional mitigation is required to protect water resources beyond what is found in other sections of this document and other APD approval requirements.

No Action Alternative

Direct and Indirect Impacts: If the wells are not drilled, no new impacts to either ground or surface water quality would occur.

Protective/Mitigation Measures: None

3.3 BIOLOGICAL RESOURCES

3.3.1 INVASIVE PLANTS*

Affected Environment: Invasive plants are common in the area due to historical agricultural practices. The project area was heavily grazed in the past but has not been grazed by commercial livestock since 1995. The ecological sites that make up the project site are prone to a wide variety of weeds if severe soil surface disturbance occurs.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Due to the long-term exposure of the project area to historical agricultural practices, expected impacts are thought to be minor.

Protective/Mitigation Measures: Equipment used to implement the proposed action should be washed prior to entering the project area to remove any plant materials, soil, or grease. Areas disturbed by project implementation will be monitored for the presence of weeds on the Colorado State Noxious Weed list. Identified noxious weeds will be treated. Monitoring is required for the life of the project and for three years following completion and/or abandonment of the wells and elimination of identified Colorado State Noxious Weeds list A and B species.

No Action Alternative

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

*Invasive plants are plants that are not part of (if exotic), or are a minor component of (if native), the original plant community or communities that have the potential to become a dominant or co-dominant species on the site if their future establishment and growth are not actively controlled by management interventions, or are classified as exotic or noxious plants under state or federal law. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants.

3.3.2 THREATENED, ENDANGERED AND SENSITIVE SPECIES

Affected Environment: The habitat in the project area consists of sand sagebrush and includes species such as western wheatgrass, prairie sandreed, red threeawn, sand dropseed, needle and thread, cheatgrass. There are small amounts of yucca, prickly pear, and annual forbs. Several small groves of mature cottonwood and elm trees are found in the west part of the section near the abandoned homestead. These trees were apparently planted years ago as shelterbelts. Ground cover averages about 40% live vegetation and 25% litter and 35% bare ground.

Ferruginous hawks is a BLM sensitive species that will nest in isolated trees or small groves of trees and on other elevated sites such as rock outcrops, buttes, large shrubs, haystacks, and low cliffs. Nests are situated adjacent to open areas such as grassland or shrubsteppe. These hawks are closely associated with prairie dog colonies, especially in winter.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Any trees located on federal mineral estate that could provide nesting habitat for ferruginous hawks should be protected. Ferruginous hawks are sensitive to disturbance at the nest; activities such as mineral extraction near nests result in lower nest success or abandonment. There should be no activities within 0.5 mi of active nests.

Protective/Mitigation Measures: No well drilling or road construction should take place in the S1/2 NW1/4 and the SW1/4 of section 36 between February 1 and July 15 for the protection of raptor nesting habitat. A ferruginous hawk nest survey may be conducted if a request is made to drill during the closure period. If it is determined that no ferruginous hawks are nesting in the closure area that year, drilling may be approved. There should be no surface use within 0.5 mi of active nests. To protect ferruginous hawk nesting habitat, no new roads should be built within one quarter mile of the shelterbelt groves located in the west half of the section and no trees should be removed.

No Action Alternative

Direct and Indirect Impacts: None.

Protective/Mitigation Measures: None.

Finding on the Public Land Health Standard for Threatened & Endangered species:
Public land health standards do not apply on private lands.

3.3.3 WILDLIFE TERRESTRIAL (includes a finding on standard 3)

Affected Environment: The action area is located within the short-grass prairie habitat type that is likely grazed at some point in the year. However, this section of land has experienced extensive disturbance from oil and gas activity. The utility of the action area to wildlife as critical habitat, specifically mega fauna, is limited. Wildlife species that have adapted and are common in this habitat are mule deer, pronghorn antelope, coyote, badger, fox, various rodents and an assortment of birds, including raptors such as Swainson's hawk and rough legged hawk. Trees located within the action area may provide suitable nesting habitat for raptors.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: The proposed action will result in a relatively small amount of lost habitat. The proposed action will use existing infrastructure and expand existing facility sites. Habitat adjacent to the disturbance footprint may not be utilized by wildlife due to its proximity to drilling and production activity. Human activity peaks at the drilling phase, causing increased stress levels or excluding wildlife from the action area. When wells are in production there is significantly less human activity and some species will adapt to the disturbances.

Protective/Mitigation Measures: A visual survey for raptor nests will be conducted in surrounding trees and uplands within a quarter mile of the project site. If an active raptor nest is found, a no surface use timing limitation from February 1 through August 15 will be applied.

No Action Alternative

Direct and Indirect Impacts: None.

Protective/Mitigation Measures: None.

Finding on the Public Land Health Standard for Threatened & Endangered species:

Public land health standards do not apply on private lands.

3.3.4 MIGRATORY BIRDS

Affected Environment: The habitat in the project area consists of sand sagebrush and includes species such as western wheatgrass, prairie sandreed, red threeawn, sand dropseed, needle and thread, cheatgrass. There are small amounts of yucca, prickly pear, and annual forbs. Several small groves of mature cottonwood and elm trees are found in the west part of the section near the abandoned homestead. These trees were apparently planted years ago as shelterbelts. Ground cover averages about 40% live vegetation and 25% litter and 35% bare ground. Cassin's sparrow are on the US Fish and Wildlife Services "Birds of Conservation Concern-2008 List for BCR-16 (Shortgrass Prairie) and might occur in the project area based on their habitat requirements.

Cassin's sparrows breed in northeastern Colorado and throughout the eastern plains with highest concentrations in the southeast. These sparrows inhabit shortgrass prairie with scattered shrubs (including sand sagebrush, yucca, and rabbitbrush), that they use for song perches and nest cover. Breeding birds will accept a wide range of shrub densities as long as grass cover exists. Cassin's sparrows arrive in Colorado in early to mid-April, but most do not initiate nesting until late May. Incubation and brooding take place in June, and most young fledge by mid-July. Their diet consists of invertebrates (beetles, grasshoppers, crickets) and seeds.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Surface disturbing activities associated with oil and gas development, such as road building, pipeline installation or pad construction may "take" nests if such activity were to occur during the nesting season. Noise generated during construction, drilling, and production phases will likely result in a larger impact footprint than the disturbance footprint alone. Migratory birds may be burned or killed by exhaust vents, heater-treaters, flare stacks, etc., if perched at the opening while in operation. An increase in activity, i.e. road traffic, will likely result in an increase in vehicular collisions with migratory birds.

The location and surrounding area is highly disturbed by oil and gas development. While the habitat may not be ideal, some plains birds have adapted to and currently use habitat patches within well fields for reproduction and growth. However, it is likely that species richness and diversity have been forfeited to some degree as a result of this conversion. In this case, it is unlikely the proposed action will cause an additive negative impact to migratory birds currently present at the site.

Protective/Mitigation Measures: To be in compliance with the Migratory Bird Treaty Act (MBTA) and the Memorandum of Understanding between BLM and USFWS required by Executive Order 13186, BLM must avoid actions, where possible, that result in a “take” of migratory birds. Generally this is a seasonal restriction that requires vegetation disturbance be avoided from May 15 thru July 15. This is the breeding and brood rearing season for most Colorado migratory birds. If the operator prefers to conduct vegetation disturbing activities during the restricted period, the operator may contract a qualified wildlife biologist to conduct a migratory nest survey clearing the project footprint of migratory bird nests prior to vegetation disturbance.

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, and in-line units. Any action that may result in a “take” of individual migratory birds or nests that are protected by MBTA will not be allowed.

No Action Alternative

Direct and Indirect Impacts: None.

Protective/Mitigation Measures: None.

3.4 HERITAGE RESOURCES AND HUMAN ENVIRONMENT

3.4.1 CULTURAL RESOURCES

Affected Environment: Both prehistoric and historic sites are present in the vicinity of the area of potential effect [Reports CR-RG-89-43 (P), CR-RG-07-76 (P), and CR-RG-07-80 (P)]. A historic ditch (5WL1485.1) is located adjacent to Well Pad #1 (the westernmost). As long as the well pad does not extend as far as the site, there will be no effect on the ditch.

Protective/Mitigation Measures: Well Pad #1 must avoid the historic property (5WL1485.1).

3.4.2 NATIVE AMERICAN RELIGIOUS CONCERNS

Affected Environment: Although aboriginal sites are present in the vicinity of the area of potential effect, no possible traditional cultural properties were located during the cultural resources inventory (see Cultural Resources section, above). There is no other known evidence that suggests the project area holds special significance for Native Americans.

3.4.3 PALEONTOLOGICAL RESOURCES

Affected Environment: The proposed wells are geographically located in an area overlying part of the geologic feature that is the eastern flank of the Denver Basin. The Basin consists of a

large asymmetric syncline of Paleozoic, Mesozoic, and Cenozoic sedimentary rock layers, trending north to south along the east side of the Front Range from about Pueblo north to Wyoming. The basin is deepest near Denver and ascends gradually to its eastern outcrop in central Kansas. Quaternary gravel deposits underlie the proposed well location.

Quaternary gravel deposits are Class 3 geologic formations, according to the BLM's Potential Fossil Yield Classification (PFYC) System that was created to assist in determining proper mitigation approaches for surface disturbing activities (WO IM2008-009). Class 3 indicates moderate potential for paleontologic resources. The potential for this proposed project to be sited on or impact a significant fossil locality is low but somewhat higher for more common fossils.

Environmental Effects

Proposed Action: The 4 proposed well pads would have a maximum cut of 12 feet associated with the construction of well pad #3. Construction of all 4 well pads would result in approximately 47 acres of surface disturbance, most of which is disturbing reclaimed surface. The total disturbance includes installation of a new pipeline.

Construction activities for the proposed well may potentially penetrate the protective soil layer and potentially encounter protected vertebrate fossils.

Direct and Indirect Impacts: Potential impacts to fossil localities would be both direct and indirect. Direct impacts to or destruction of fossils would occur from unmitigated activities conducted on formations with high potential for important scientific fossil resources. Indirect impacts would involve damage or loss of fossil resources due to the unauthorized collection of scientifically important fossils by workers or the public due to increased access to fossil localities in the Project Area. Adverse impacts to important fossil resources would be long-term and significant since fossils removed or destroyed would be lost to science. Adverse significant impacts to paleontological resources can be reduced to a negligible level through mitigation of ground disturbing activities. It is possible that the proposed project would have the beneficial impact that ground disturbance activities might result in the discovery of important fossil resources.

Protective/Mitigation Measures: The proposed construction of the well pads and access to the well pads may penetrate the protective soil layer impacting the bedrock unit below. Due to the lower probability of the location having fossil resources present, paleontological survey work will not be required however; In order to prevent potential impacts to paleontologic resources, a condition of approval shall be attached to the APD that directs the holder to notify the BLM RGFO immediately if any vertebrate fossils or their traces are discovered during operations. Operations may continue as long as the fossil specimen would not be damaged or destroyed by the activity. Within 5 working days of notification, the BLM RGFO shall evaluate or have evaluated such discoveries and shall notify the operator what action shall be taken with respect to such discoveries.

In many instances where the surface estate is not owned by the Federal Government, the mineral estate is, and is administered by the BLM. Paleontological resources are considered to be part of

the surface estate. If BLM is going to approve an action involving the mineral estate that may affect the paleontological resources, the action should be conditioned with appropriate paleontological mitigation recommendations to protect the interests of the surface owner. The surface owner may elect to waive these recommendations.

3.4.4 WASTES, HAZARDOUS OR SOLID

Affected Environment: It is assumed that conditions associated with the proposed project site, both surface and subsurface, are currently clean and that there is no known contamination. A determination will be made by the operator prior to initiating the project, if there is evidence that demonstrates otherwise (such as solid or hazardous wastes have been previously used, stored, or disposed of at the project site).

Nothing in the analysis or approval of this action by BLM authorizes or in any way permits a release or threat of a release of hazardous materials (as defined under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. 9601 et seq., and its regulations) into the environment that will require a response action or result in the incurrence of response costs.

Environmental Effects

Proposed Action

Direct and Indirect Impacts: Possible contaminant sources associated with the drilling operations are:

- Storage, use and transfer of petroleum, oil and lubricants
- Produced fluids
- General hazardous substances, chemicals and/or wastes
- Concrete washout water
- Drilling water, mud and cuttings

Protective/Mitigation Measures: The following mitigation will assist in reducing potential spills resulting in groundwater and/or soil contamination:

- All Above Ground Storage Tanks will need to have secondary containment and constructed in accordance with standard industry practices or an associated Spill Prevention Control and Countermeasures plan in accordance with State regulations (if applicable).
- If drums are used, secondary containment constructed in accordance with standard industry practices or governing regulations is required. Storage and labeling of drums should be in accordance with recommendations on associated MSDS sheets, to account for chemical characteristics and compatibility.
- Appropriate level of spill kits need to be onsite and in vehicles.
- All spill reporting needs to follow the reporting requirements outlined in NTL-3A.
- No treatment or disposal of wastes on site is allowed.
- All concrete washout water needs to be contained and properly disposed of at a permitted offsite disposal facility.

- If pits are utilized they need to be lined to mitigate leaching of liquids to the subsurface, as necessary.

No Action Alternative

Direct and Indirect Impacts: None

Protective/Mitigation Measures: None

3.5 CUMULATIVE IMPACTS SUMMARY

Air: The area currently has a high degree of alteration in the form of agricultural fields, roads, houses, and oil and gas production. The addition of the infrastructure needed to construct and drill the additional pad and well would have a cumulative impact to the area's air quality; however, given the existing level of development in the area, the proposed well's impact would be very minor. In the long term, if economical quantities of oil and gas are found, additional wells can be expected to be drilled on Federal, State, and private lands. This could result in a larger impact to air quality in the future. However, given that the area is currently designated as a nonattainment area for ozone, the state requires additional, more stringent pollution control measures for oil and gas activities in such areas.

With respect to ozone, the current nonattainment area episodic anthropogenic emissions budget approved by the Colorado Air Quality Control Commission (December 12, 2008) for NO_x and VOCs (ozone precursors) is 334.6tpd and 425.4tpd respectively. These emissions represent reductions projected to be realized (in 2010) from the implementation of additional rules which are now a part of the Colorado Air Quality Control Regulations (AQCRs). The reductions were modeled to show progress towards attaining the ozone standard for the worst ozone days. The emissions inventory included a comprehensive speciation of point, mobile (on-road and non-road), oil and gas (point and area), and biogenic sources. The Technical Support Document (TSD) for the inventory provides the basis for the inventory and includes broad cross sections of the economy. As such, and given the projected pace of development for the inventory, it is likely that the project emissions for the 12 USA Federal wells are adequately covered and evaluated in the APCD episodic analysis. Given the likely coverage, it is not anticipated the project will have a measurable impact on regional ozone formation outside of the modeled parameters. Additionally, drilling is currently scheduled for late fall 2013, and thus will not coincide with the traditional ground level ozone formation season (i.e. summer).

With respect to GHG emissions, the following predictions were identified by the EPA for the Mountain West and Great Plains region:

- The region will experience warmer temperatures with less snowfall.
- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow will be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs will be drier.
- More frequent, more severe, and possibly longer-lasting droughts will occur.
- Crop and livestock production patterns could shift northward; less soil moisture due to increased evaporation may increase irrigation needs.

- Drier conditions will reduce the range and health of ponderosa and lodge pole pine forests, and increase the susceptibility to fire.
- Grasslands and rangelands could expand into previously forested areas.
- Ecosystems will be stressed and wildlife such as the mountain line, black bear, long-nose sucker, marten, and bald eagle could be further stressed.

If these predictions are realized as mounting evidence suggests is already occurring, there could be impacts to resources within the region. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Warmer temperatures with decreased snowfall could have an impact on a particular plants ability to sustain itself within its current range. An increased length of growing season in higher elevations could lead to a corresponding variation in vegetation and change in species composition. These types of changes would be most significant for special status plants that typically occupy a very specific ecological niche. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened or endangered plants may be accelerated. Invasive plant species would be more likely to out-compete native species.

Increases in winter temperatures in the mountains could have impacts on traditional big game migration patterns. Due to loss of habitat, or due to competition from other species whose ranges may shift northward, the population of some animal species may be reduced. Warmer winters with less snow would impact the Canada lynx by removing a competitive advantage they have over other mountain predators. Earlier snowmelt could also have impacts on cold water fish species that occupy streams throughout the planning area. Climate change could affect seasonal frequency of flooding and alteration of floodplains, which could impact riparian conditions. More frequent and severe droughts would have impacts on many wildlife species throughout the region as well as vegetative composition and availability of livestock forage in some areas. Climate change could increase the growing season within the region, however, so longer growing season in theory would result in more forage production provided there is sufficient precipitation. Drier conditions could have severe impacts on forests and woodlands. This could leave these forests and woodlands more susceptible to insect damage and at higher risk of catastrophic wildfires. Increased fire activity and intensity would increase greenhouse gas emissions.

Geologic and Mineral Resources: Cumulative impacts on geology and minerals resources would primarily occur as a result of oil and gas development, which would irreversibly deplete recoverable oil and gas from the producing formations.

Soils: The area around the proposed wells has a variety factors effecting soils including roads, housing, agriculture, and livestock grazing. The addition of the infrastructure needed to drill the pads would have an additional impact to the areas soils. At the watershed scale, the addition of the two proposed wells and related construction would have an immeasurable impact to the soils of the area in the future given the current agricultural use in the proposed project area.

Migratory Birds: The location and surrounding area is highly disturbed by oil and gas development. While the habitat may not be ideal, some plains birds have adapted to and currently use habitat patches within well fields for reproduction and growth. However, it is

likely that species richness and diversity have been forfeited to some degree as a result of this conversion. In this case, it is unlikely the proposed action will cause an additive negative impact to migratory birds currently present at the site

CHAPTER 4 - CONSULTATION AND COORDINATION

4.1 LIST OF PREPARERS AND PARTICIPANTS

Please see Interdisciplinary Team Review list for BLM Participants

4.2 TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED

Native American Tribes were consulted at the lease stage.

CHAPTER 5 - REFERENCES

Bureau of Land Management. 1986. Northeast Resource Area Management Plan and Record of Decision. Lakewood, Colorado.

Bureau of Land Management. 1991. Colorado Oil and Gas Leasing Environmental Impact Statement. Lakewood, Colorado.

Bureau of Land Management. 2008 H-1790-1 National Environmental Policy Handbook. Washington, D.C.

Finding Of No Significant Impact (FONSI)

DOI-BLM-CO-200-2012-0087 EA

Based on review of the EA and the supporting documents, I have determined that the project is not a major federal action and will not have a significant effect on the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects from any alternative assessed or evaluated meet the definition of significance in context or intensity, as defined by 43 CFR 1508.27. Therefore, an environmental impact statement is not required. This finding is based on the context and intensity of the project as described below:

RATIONALE:

Context: The BLM has received 12 Application Permits to Drill (APDs), proposing the construction of a 4 well pad locations, 2 facility pads, pipeline gathering system and underground electrical lines on federal surface/federal minerals in the central part of Weld County, 17 miles south of the City of Greeley. The federal mineral estate is leased and subject to oil and gas development.

The general area description would be defined as rural farmland and ranchland south of the South Platte River. There are few county roads in the project area and a state highway nearby. Most access is limited to private landowner or oil and gas developed roadways. The roadways vary in development but most are dirt/primitive roads.

Extensive oil and gas development has occurred in the area, mostly on private mineral estate.

Intensity:

I have considered the potential intensity/severity of the impacts anticipated from the proposed USA Fed 04N-36HZ, USA Fed 29N-36HZ, USA Fed 30C-36HZ, USA Fed 29C-36HZ, USA Fed 03N-36HZ, USA Fed 27N West-36HZ, USA Fed 02N-36HZ, USA Fed 02C-36HZ, USA Fed 28N-36HZ, USA Fed 01N-36HZ, USA Fed 26C-36HZ, and USA Fed 27N East-36HZ well and tank battery pads APDs. Project decision relative to each of the ten areas suggested for consideration by the CEQ. With regard to each:

Impacts that may be beneficial and adverse:

There would be minor impacts to air quality from the proposed wells. Most of this would occur during the drilling phase. Potential impacts might occur to ground water; however such impacts should not occur if strict drilling requirements are followed. Other minor impacts might occur to wildlife and migratory birds but would be mitigated through the use of timing stipulations. Positive impacts include benefits in royalties and revenue generated to the federal government from productive wells. Other indirect effects could include effects due to overall employment opportunities related to the oil and gas and service support industry in the region as well as the economic benefits to state and county

governments related to royalty payments and severance taxes. Other beneficial impacts from the action would be the potential for productive wells being created that would add, albeit in a small way to national energy independence.

Public health and safety:

The proposed action will have a temporary negative impact to air quality through the generation of fugitive dust during the construction phase. Utilization of the road, surface disturbance, and construction activities such as drilling, hydraulic fracturing, well completion, and equipment installation will all impact air quality through the generation of dust related to travel, transport, and general construction. This phase will also produce short term emissions of criteria, hazardous, and greenhouse gas pollutants from vehicle and construction equipment exhausts. Once construction is complete the daily activities at the site will be reduced to operational and maintenance checks which may be as frequent as a daily visit. Emissions will result from vehicle exhausts from the maintenance and process technician visits. The pad can be expected to produce fugitive emissions of well gas, which contains mostly methane and a minor fraction of volatile organic compounds. Fugitive emissions may also result from pressure relief valves and working and breathing losses from any tanks located at the site, as well as any flanges, seals, valves, other infrastructure connections used at the site. Liquid product load-out operations will also generate fugitive emissions of VOCs and vehicular emissions. If the operator is unable to sell any produced gas from the well, then gas flaring will also produce emissions of criteria, HAP, and GHG emissions.

Unique characteristics of the geographic area:

The EA evaluated the area of the proposed action and determined that no unique geographic characteristics such as: wild and scenic rivers, prime or unique farmlands, Areas of Critical Environmental Concern, designated wilderness areas, wilderness study areas or Lands with Wilderness Characteristics; were present.

Degree to which effects are likely to be highly controversial:

The potential for controversy associated with the effects of the proposed action is low. There is no disagreement or controversy among ID team members or reviewers over the nature of the effects on the resource values on public land by the proposed action.

Degree to which effects are highly uncertain or involve unique or unknown risks:

The drilling of oil and gas wells has occurred historically over the past century and although the potential risks involved can be controversial, they are neither unique nor unknown. There is low potential of unknown or unique risks associated with this project due to numerous other well locations having been successfully drilled in this area of Weld County.

Consideration of whether the action may establish a precedent for future actions with significant impacts:

The proposed APDs will be limited to standard construction procedures associated with pad/road construction and drilling in Weld County and have occurred historically on split

and private mineral estate. There are no aspects of the current proposal that are precedent setting.

Consideration of whether the action is related to other actions with cumulatively significant impacts:

The action is a continuation of oil and gas activities that have historically occurred in the area. Continued oil and gas activity in the area will have minor but additive impacts to air and the production greenhouse gas emissions. The project area having been subject to historic drilling activity will continue to experience gradual depletion of the recoverable oil and gas products. Although past cattle grazing had contributed to cumulative impacts, there have been no other recent activities besides oil and gas that has contributed to cumulative impacts.

Scientific, cultural or historical resources, including those listed in or eligible for listing in the National Register of Historic Places:

Both prehistoric and historic sites are present in the vicinity of the area of potential effect [Reports CR-RG-89-43 (P), CR-RG-07-76 (P), and CR-RG-07-80 (P)]. A historic ditch (5WL1485.1) is located adjacent to Well Pad #1 (the westernmost). As long as the well pad does not extend as far as the site, there will be no effect on the ditch.

Threatened and endangered species and their critical habitat:

There are no known populations of T&E species in the action area.

Any effects that threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment: The proposed action conforms with the provisions of NEPA (U.S.C. 4321-4346) and FLPMA (43 U.S.C. 1701 et seq.) and is compliant with the Clean Water Act and The Clean Air Act, the National Historic Preservation Act, Migratory Bird Treaty Act (MBTA) and the Endangered Species Act.

NAME OF PREPARER: Tomas Kamienski / Aaron Richter

SUPERVISORY REVIEW: Jay Raiford

NAME OF ENVIRONMENTAL COORDINATOR: /s/ Martin Weimer

DATE: 4/24/13

SIGNATURE OF AUTHORIZED OFFICIAL:

/s/ Keith E. Berger
Keith E. Berger, Field Manager

DATE SIGNED: 4/25/13

APPENDICES:

ATTACHMENTS:

**UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ROYAL GORGE FIELD OFFICE**

DECISION RECORD
Project Name
DOI-BLM-CO-200-2012-0087-EA

DECISION: It is my decision to authorize the Proposed Action as described in the attached EA. The proposed action is to construct well and production pads and install underground utilities in order to drill and develop federal minerals from federal surface. Access to the proposed USA Fed 04N-36HZ, USA Fed 29N-36HZ, USA Fed 30C-36HZ, USA Fed 29C-36HZ, USA Fed 03N-36HZ, USA Fed 27N West-36HZ, USA Fed 02N-36HZ, USA Fed 02C-36HZ, USA Fed 28N-36HZ, USA Fed 01N-36HZ, USA Fed 26C-36HZ, and USA Fed 27N East-36HZ well and tank battery pads would be gained by traveling on existing state, county and petroleum field roads.

The proposed project is located in the central part of Weld County east of the City of Greeley, Colorado. The federal mineral estate within the project boundary is leased and subject to oil and gas development.

The proposed action was analyzed in the Environmental Assessment (EA) DOI-BLM-CO-200-2012-0087 and a Finding of No Significant Impact was reached and an EIS will not be prepared.

RATIONALE: This APD will develop oil and gas resources on Federal minerals Lease COC37842 consistent with existing Federal lease rights provided for in the Mineral Leasing Act of 1920, as amended. Extensive oil and gas development has occurred throughout the project area, mostly on private mineral estate.

The project area currently has a high degree of alteration in the form of agricultural fields, roads, houses, and oil and gas production. The addition of the infrastructure needed to construct and drill the four proposed wells would have mostly temporary and overall minor impacts on resources present in the project area.

MITIGATION MEASURES\MONITORING:

Anadarko would use industry best practices, including watering, graveling, and reseeded to reduce fugitive dust emissions from vehicular traffic and disturbed surfaces. Interim reclamation and existing agricultural practices will be implemented in order to stabilize the site and prevent fugitive dust from being generated. In addition the following BLM requirements will apply:

- Process equipment will be permitted by CDPHE in accordance with applicable requirements and required emissions standards to limit the facility's potential to emit and provide appropriate operating, monitoring, and recordkeeping requirements.
- COA - All FRAC Pump engines will be required to meet EPA Non-Road Tier II Emissions Standards.

- The company will perform ‘Green Completions’ for all wells.
- COA - All Drill Rigs will be required to meet EPA Non-Road Tier II Emissions Standards for all drilling operations.

It is expected that the operator will comply with these requirements and make every effort to minimize emissions through good engineering and operating practices to the maximum extent practical.

Geology and Mineral Resources: If the proposed project plans to utilize federal minerals in the construction of roads, pad building or for any other construction needs, then compliance with 43 CFR 3600 is required. The project proponent will need to submit an application for a mineral materials disposal with BLM, prior to any disturbance being initiated. Federal mineral materials regulations also apply to split estate (i.e. a private surface landowner could not dispose of federal mineral materials for this project, surface or subsurface, without prior authorization from the BLM).

BLM Onshore Order #2 (OO#2) requires that the proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. A review at the Application for Permit to Drill stage includes a geologic evaluation of the potential subsurface formations that will be penetrated by the wellbore, followed by an engineering analysis of the drilling program to ensure the well construction design is adequate to protect the surface and subsurface environment, including the potential risks identified by the geologist, and all known or anticipated zones with potential risks.

BLM will require that the surface casing be run across the aquifers, and placed at least 50 feet into a formation that should not fracture or breakdown with the maximum weighting of mud that may be needed when drilling to the depth that the intermediate casing is going to be set. Before drilling an intermediate hole, the surface casing will be cemented in place to surface between the casing and the formation.

A BLM representative may be on location during the casing and cementing of groundwater-protective surface casing and other critical casing and cementing intervals constructed to isolate subsurface zones that present high risk for potential adverse impact to human health or safety or at high risk potential for environmental contamination.

A cement bond log will be required on the production casing, to ensure the quality of the cement bond between the casing and the formation. A minimum of 100 feet of cement will be required above any producing interval, or any zone of interest. Remedial cementing procedures will be required when cementing doesn't meet BLM requirements.

Paleontologic Resources: The proposed construction of the well pads and access to the well pads will penetrate the protective soil layer therefore impacting the bedrock unit below. Due to the lower probability of the location having fossil resources present, paleontological survey work will not be required however; In order to prevent potential impacts to paleontologic resources, a condition of approval shall be attached to the APD that directs the holder to notify the BLM

RGFO immediately if any vertebrate fossils or their traces are discovered during operations. Operations may continue as long as the fossil specimen would not be damaged or destroyed by the activity. Within 5 working days of notification, the BLM RGFO shall evaluate or have evaluated such discoveries and shall notify the operator what action shall be taken with respect to such discoveries.

In many instances where the surface estate is not owned by the Federal Government, the mineral estate is, and is administered by the BLM. Paleontological resources are considered to be part of the surface estate. If BLM is going to approve an action involving the mineral estate that may affect the paleontological resources, the action should be conditioned with appropriate paleontological mitigation recommendations to protect the interests of the surface owner. The surface owner may elect to waive these recommendations.

Invasive Plants: Equipment used to implement the proposed action should be washed prior to entering the project area to remove any plant materials, soil, or grease. Areas disturbed by project implementation will be monitored for the presence of weeds on the Colorado State Noxious Weed list. Identified noxious weeds will be treated. Monitoring is required for the life of the project and for three years following completion and/or abandonment of the wells and elimination of identified Colorado State Noxious Weeds list A and B species.

Threatened, Endangered and Sensitive Species: No well drilling or road construction should take place in the S1/2 NW 1/4 and the SW 1/4 of section 36 between February 1 and July 15 for the protection of raptor nesting habitat. A ferruginous hawk nest survey may be conducted if a request is made to drill during the closure period. If it is determined that no ferruginous hawks are nesting in the closure area that year, drilling may be approved. There should be no surface use within 0.5 mi of active nests. To protect ferruginous hawk nesting habitat, no new roads should be built within one quarter mile of the shelterbelt groves located in the west half of the section and no trees should be removed.

Wildlife Terrestrial: A visual survey for raptor nests will be conducted in surrounding trees and uplands within a quarter mile of the project site. If a nest is found, a no surface use timing limitation from February 1 through August 15 will be implemented.

Migratory Birds: To be in compliance with the Migratory Bird Treaty Act (MBTA) and the Memorandum of Understanding between BLM and USFWS required by Executive Order 13186, BLM must avoid actions, where possible, that result in a “take” of migratory birds. Generally this is a seasonal restriction that requires vegetation disturbance be avoided from May 15 thru July 15. This is the breeding and brood rearing season for most Colorado migratory birds. If the operator prefers to conduct vegetation disturbing activities during the restricted period, the operator may contract a qualified wildlife biologist to conduct a migratory nest survey clearing the project footprint of migratory bird nests prior to vegetation disturbance.

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-

treaters, separators, dehydrators, flare stacks, and in-line units. Any action that may result in a “take” of individual migratory birds or nests that are protected by MBTA will not be allowed.

As described in the proposed action, all open pits will be fenced and netted in a manner to exclude migratory birds until all liquid is absent and backfilling has been initiated. Any secondary containment system will be covered in a manner to prevent access by migratory birds. The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, and in-line units. Any action that may result in a “take” of individual migratory birds or nests that are protected by MBTA will not be allowed.

Cultural Resources: Well Pad #1 must avoid the historic property (5WL1485.1), which is a ditch.

Paleontological Resources: In order to prevent potential impacts to paleontologic resources, a condition of approval shall be attached to the APD that directs the holder to notify the BLM RGFO immediately if any vertebrate fossils or their traces are discovered during operations.

Operations may continue as long as the fossil specimen would not be damaged or destroyed by the activity. Within 5 working days of notification, the BLM RGFO shall evaluate or have evaluated such discoveries and shall notify the operator what action shall be taken with respect to such discoveries.

Wastes, Hazardous or Solid: The following mitigation will assist in reducing potential spills resulting in groundwater and/or soil contamination:

- All Above Ground Storage Tanks will need to have secondary containment and constructed in accordance with standard industry practices or an associated Spill Prevention Control and Countermeasures plan in accordance with State regulations (if applicable).
- If drums are used, secondary containment constructed in accordance with standard industry practices or governing regulations is required. Storage and labeling of drums should be in accordance with recommendations on associated MSDS sheets, to account for chemical characteristics and compatibility.
- Appropriate level of spill kits need to be onsite and in vehicles.
- All spill reporting needs to follow the reporting requirements outlined in NTL-3A.
- No treatment or disposal of wastes on site is allowed.
- All concrete washout water needs to be contained and properly disposed of at a permitted offsite disposal facility.
- If pits are utilized they need to be lined to mitigate leaching of liquids to the subsurface, as necessary.

PROTEST/APPEALS: This decision shall take effect immediately upon the date it is signed by the Authorized Officer, and shall remain in effect while any appeal is pending unless the Interior

Board of Land Appeals issues a stay (43 CFR 2801.10(b)). Any appeal of this decision must follow the procedures set forth in 43 CFR Part 4. Within 30 days of the decision, a notice of appeal must be filed in the office of the Authorized Officer at the Royal Gorge Field Office, 3028 E. Main, Cañon City, Colorado, 81212. If a statement of reasons for the appeal is not included with the notice, it must be filed with the Interior Board of Land Appeals, Office of Hearings and Appeals, U.S. Department of the Interior, 801 North Quincy St., Suite 300, Arlington, VA 22203 within 30 days after the notice of appeal is filed with the Authorized Officer.

SIGNATURE OF AUTHORIZED OFFICIAL:

/s/ Keith E. Berger
Keith E. Berger, Field Manager

DATE SIGNED: 4/25/13

ATTACHMENTS:

APPENDIX A - NEAR-FIELD AIR QUALITY IMPACTS MODELING ASSESSMENT

A near-field ambient air quality impact assessment was performed to quantify and evaluate maximum pollutant impacts within the vicinity of the Project Area resulting from construction and production emissions. The near-field analysis predicts impacts that could occur within one kilometer of the Project area. USEPA's recommended guideline model, AERMOD (version 12345), was used to assess near-field impacts. The near-field modeling analyses followed guidance and recommendations provided by Colorado APCD (CDPHE 2011) and EPA (EPA 2005).

Near-field modeling predicted short-term averaged ambient concentrations for the following criteria pollutants: NO₂, PM₁₀, and PM_{2.5}. These pollutants and averaging periods were modeled because of the short-term temporal nature of the Project construction related activities while recognizing the Colorado APCD air quality modeling emissions thresholds (CDPHE 2011). Due to the complexity of meeting air quality standards for these pollutants and averaging times, compliance for these short-term analyses also serve as compliance for these pollutants long-term standards.

Additional information for how the near-field modeling domain was established and setup is provided later in this report in section "Near-Field Modeling Setup and Emissions".

MODELING INPUTS AND METHODOLOGY

Meteorology

Meteorological surface data was collected from a National Weather Service (NWS) ASOS at Greeley, Colorado Airport (WBAN: 24051) located at 40.44N, 104.63W for five years (2008 – 2012). Data collected at the surface meteorological station for the creation of the near-field modeling dataset included numerous parameters such as wind speed, wind direction, temperature, relative humidity, cloud cover, atmospheric pressure, visibility, and precipitation. Upper air radiosonde data was collected by the National Weather Service in Denver, Colorado, located at 39.77N, 104.88W. The complete aggregation of raw monitored meteorological data values was processed by AERMET (version 12345) with monthly values for albedo, Bowen ratio, and surface roughness length derived specifically for the Greeley Airport to produce an AERMOD ready dataset.

Terrain

High-resolution (~ 10 meter) topography data was used by ArcMAP interpolation tools to determine base elevations for emissions sources and ambient receptors.

Near-Field Modeling Setup and Emissions

Near-field ambient air models of criteria pollutants were created with AERMOD to assess potential impacts from oil and gas related construction and production activities. To

conservatively estimate potential near-field emissions for Project activities, road traffic and well pad volume sources and well pad point sources were modeled together for the AERMOD modeling analysis.

The following table provides annual emissions rates divided up by modeling source group:

Table 1. Annual Emissions

Emissions Source Type / Group	PM₁₀	PM_{2.5}	NO_x
total emissions for construction traffic volumes (TPY)	5.13	0.96	7.93
total emissions for construction well pad volumes (TPY)	2.25	0.28	0.00
total emissions for construction well pad points (TPY)	2.19	2.13	79.39
construction total (TPY)	9.58	3.36	87.32
total emissions for production traffic volumes (TPY)	0.43	0.06	0.30
total emissions for production well pad volumes (TPY)	0.07	0.02	0.14
total emissions for production well pad points (TPY)	1.15	1.15	18.31
production total (TPY)	1.64	1.23	18.75

The following table provides emissions rates that were input into AERMOD:

Table 2. Emissions Rates Modeled

Emissions Source Type / Group	PM₁₀	PM_{2.5}	NO_x
emissions for construction traffic (grams/sec) per volume	0.0145	0.0027	0.0224
emissions for construction well pad (grams/sec) per volume	0.0493	0.0061	0.0000
emissions for construction (grams/sec) per well pad point	0.0480	0.0465	1.7367
emissions for production traffic (grams/sec) per volume	0.0004	0.0001	0.0003
emissions for production well pad (grams/sec) per volume	0.0005	0.0002	0.0010
emissions for production (grams/sec) per well pad point	0.0083	0.0083	0.1317

Figure 1 shows the composite near-field modeling layout. The following provides details about the emissions sources that were included in the near-field modeling and any additional information about how the emissions were released / modeled within the near-field modeling domain:

- Well pad construction dust: accounts for heavy equipment surface disturbance and assumes 50% dust control during these activities. Includes well pad access road, pipeline and well pad development. Emissions released from volume sources located at center of well pad areas. Well pad volumes release height: 1.5 meters, sigma-y: 4.7 meters and sigma-z: 1.5 meters.
- Well pad drilling and construction combustion: accounts for drilling engine operations associated with drilling a well and includes fracing and other combustion emissions. Uses Tier 1 engines emissions factors for heavy equipment such as graders, scrapers and

dozers, and uses Tier 2 engines emissions factors for drill rig and fracing engines and other engines for well development. Emissions released from point source at center of “drilling” well pad locations. Point source height: 6.2 meters, exhaust exit temperature: 675 K, exhaust velocity: 30 meters/second and stack tip diameter: 0.2 meters.

- Development related traffic: accounts for traffic associated with well pad access road, pipeline and well pad constructions, as well as drilling, completion and re-completion related activities. Emissions distributed evenly among all access roads volume sources with release height: 1.5 meters, sigma-y: 1.5 meters and sigma-z: 1.5 meters.
- Wind erosion: wind erosions associated with initial well pad developments surface disturbance. Emissions were distributed evenly among all well pad volume sources with release height: 1.5 meters, sigma-y: 4.7 meters and sigma-z: 1.5 meters.
- Well pad production combustion sources: accounts for all vehicle traffic combustion, flaring and well pad engines including oil wellhead pumps (artificial lift). Emissions released from “operating” point sources located at center of well pad areas with stack height: 2.0 meters, exhaust temperature: 675 K, exit velocity: 30 meters/second and stack tip diameter: 0.2 meters.
- Well pad production fugitive and dust sources: accounts for production related fugitive sources at well pads including reclamation activities and well work-over activities. Emissions were distributed evenly among all well pad volume sources with release height: 1.5 meters, sigma-y: 2.3 meters and sigma-z: 1.5 meters.
- Production related traffic: accounts for traffic associated with oil and water hauling, well pad visits for inspection and repair, and resource road maintenance activities. Emissions distributed evenly among all access roads volume sources with release height: 1.5 meters, sigma-y: 1.5 meters and sigma-z: 1.5 meters.

In addition to the information provided regarding the oil and gas emissions sources layout for the near-field modeling, the following provides more information regarding how the emissions were controlled and modeled for the analysis:

- Deposition was included for particulate matter modeling to better represent large particle fallout within short distances from emissions sources. Two size categories were specified for the modeling: $PM_{2.5}$ (≤ 2.5 micrometers [μm]) and PM_{10} ($> 2.5 \mu m$ and less than $10 \mu m$). The ratios of emissions rates determined the mass fractions for each source. The mean particle diameters were set at $1.0 \mu m$ and $7 \mu m$ for the $PM_{2.5}$ and PM_{10} particles, respectively. In addition to deposition, construction related fugitive dust emissions were 50% controlled before being modeled.
- For estimating emissions rates for short-term production phase modeling, annual production emission estimates were divided by 8,760 hours and distributed equally over the entire year hours. For estimating emissions rates for short-term construction phase modeling, annual construction emissions were divided by 2,880 hours (120×24) using the approximation of 120 days to complete construction.
- EPA Tier 2 NO_x to NO_2 conversion factor 0.80 was applied to AERMOD modeled NO_x concentrations for estimating NO_2 impacts.

The following outline provides details about the near-field receptor grid surrounding the emissions sources. The receptor network is shown in Figure 1.

- 50 meter receptor spacing along ambient boundary
- 100 meter receptor spacing out to ~ 1,000 meters of ambient boundary

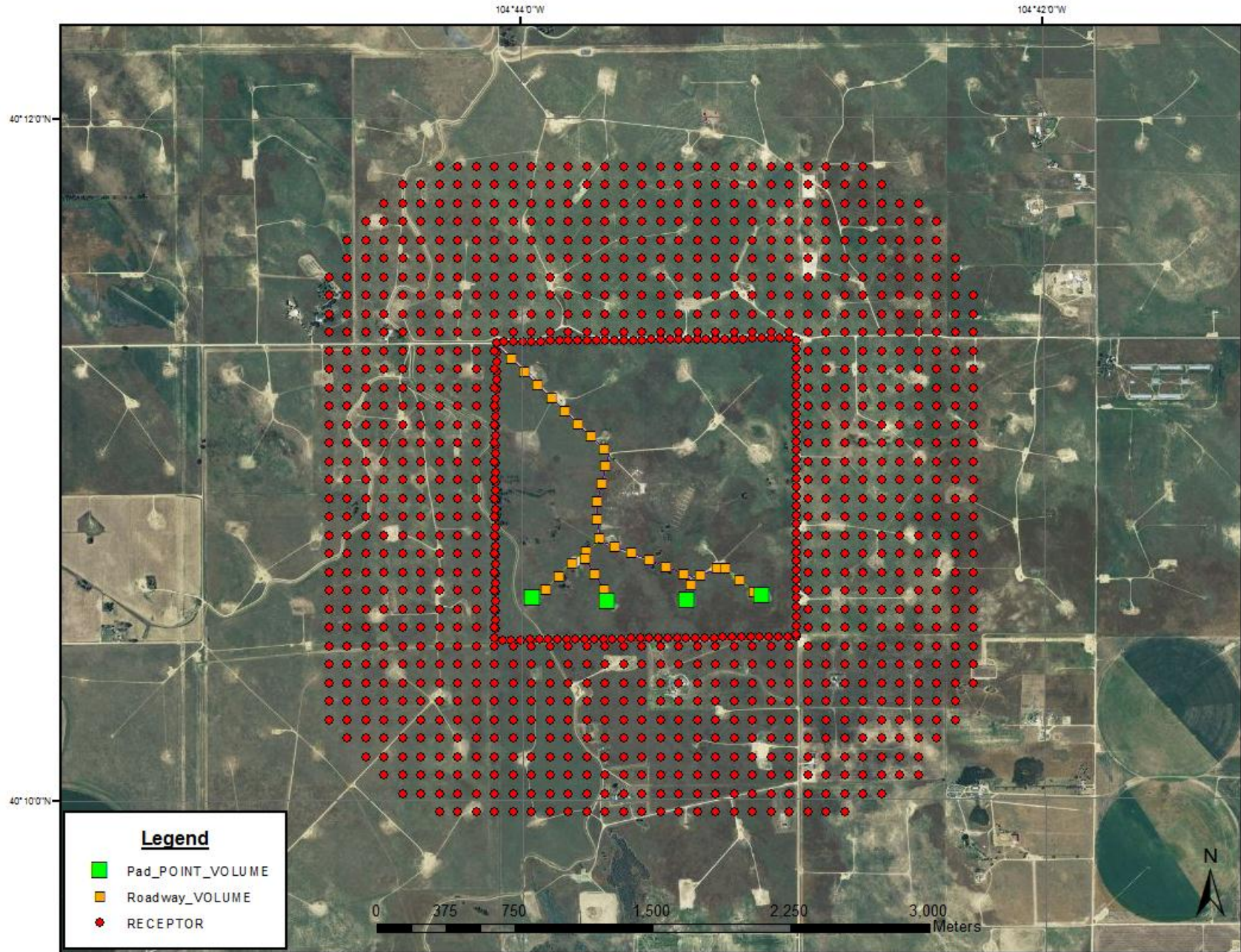


Figure 1. Near-Field Modeling Layout

NEAR-FIELD ASSESSMENT OF AIR QUALITY IMPACTS

Criteria Pollutants

The predicted criteria pollutant concentrations were compared with applicable Ambient Air Quality Standards (AAQS) as shown in the following table.

Table 3. Ambient Air Quality Standards

Pollutant	Averaging Period	AAQS (Colorado and National) ($\mu\text{g}/\text{m}^3$)
PM ₁₀	24-Hour ^a	150
PM _{2.5}	24-Hour ^b	35
NO ₂	1-Hour ^c	189

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

^a Not to be exceeded more than once per year.

^b 3-year average of the 98th percentile of the daily 24-hour average at each receptor within the area must not exceed this Standard.

^c 3-year average of the 98th percentile of the daily maximum 1-hour average at each receptor within the area must not exceed this Standard.

Table 4 provides the maximum modeled concentration for each criteria pollutant, averaging time, and modeled year using Project emission rates for the near-field layout (Figure 1 shows the near-field modeling layout).

The EPA modeling guidelines for NO₂ 1-hour (EPA 2010) suggests estimating the maximum full 5-year modeling period average of the 98th percentile of the daily maximum 1-hour concentration at each receptor. Due to the short-term temporal extent of the construction phase for the Project (~ 4 months), the 5-year average of the daily maximum 1-hour concentration at each receptor associated with the production emissions was averaged with the daily maximum 1-hour concentration at each receptor for each construction year modeling run to determine a realistic short-term NO₂ 1-hour impact. The 5-year production daily maximum 1-hour concentrations were the same for each modeled construction phase year run and the maximum value for each combination was determined to provide the overall maximum shown in Table 4 below.

The maximum (first high) PM₁₀ 24-hour average value for all 5-year modeling period runs concentrations associated with production emissions was added to the maximum second high PM₁₀ 24-hour average value for all 5-year modeling period runs associated with construction emissions and is provided in Table 4.

The maximum (first high) PM_{2.5} 24-hour average value for all 5-year modeling period runs average concentrations associated with production emissions was added to the maximum eighth

high PM_{2.5} 24-hour average value for all 5-year modeling period runs average concentrations associated with construction emissions and is provided in Table 4.

For all near-field modeled criteria pollutants and averaging times, predicted Project-only near-field impacts are below the AAQS.

Table 4. AERMOD Predicted Concentrations

Pollutant	Averaging Period	AERMOD Predicted Concentrations (µg/m³)	AAQS (µg/m³)
PM ₁₀	24-Hour	64.2	150
PM _{2.5}	24-Hour	6.4	35
NO ₂	1-Hour	93.6	189

µg/m³ = micrograms per cubic meter

NO₂ = nitrogen dioxide

PM₁₀ / PM_{2.5} = particulate matter less than or equal to 10 microns / 2.5 microns in size

Ambient Air Background Concentration Data

Background pollutant concentration data collected at regional monitoring sites that are provided in the EPA AirData database are shown in the following table. Table 5 provides the background criteria pollutant concentrations and describes the location and data source of each concentration value. Pollutant concentrations in micrograms per cubic meter (µg/m³) are shown for all pollutants. These background concentrations could represent all non-Project near-field emissions sources impacts and be added to the near-field modeled concentrations to produce cumulative predicted near-field concentrations for comparison to applicable air quality standards.

The following Table 5 shows ambient concentrations for Denver, Colorado urban monitors as well as more rural setting concentrations for western Colorado. There is no monitored data in the near vicinity of the Project area exactly representative of its rural atmosphere, but it is reasonable to assume that the existing background ambient concentrations in the Project area would fall within the range of the urban and rural values shown in the table below. Adding an “interpolated” concentration value for the rural setting of the Project area, based on the air quality monitored data, to the AERMOD modeled values would likely result in AAQS compliance in the immediate Project area.

Table 5. Ambient Background Concentrations

Pollutant / Units	Non-Particulate Matter Background Monitored Concentrations (Year 2012)			Monitoring Station Information
	1-Hour	1-Hour	1-Hour	
NO₂ (µg/m ³)	9.97 ^a	67.37 ^b	120.44 ^c	a.Rio Blanco County 98th percentile NO ₂ 1-hour. b.Cheyenne, Wyoming 98th percentile NO ₂ 1-hour. c.North Denver, Colorado 98th percentile NO ₂ 1-hour.
Pollutant / Units	Particulate Matter Background Monitored Concentrations (Year 2012)			Monitoring Station Information
	24-Hour	24-Hour	24-Hour	
PM₁₀ (µg/m ³)	91 ^a	87 ^b	86 ^c	a.Greeley, Colorado 2nd maximum 24-hour average PM ₁₀ concentration. b.Denver, Colorado 2nd maximum 24-hour average PM ₁₀ concentration. c.North Denver, Colorado 2nd maximum 24-hour average PM ₁₀ concentration.
PM_{2.5} (µg/m ³)	19 ^a	28 ^b	17 ^c	a.Denver, Colorado 98th percentile 24-hour average PM _{2.5} concentration. b.Longmont, Colorado 98th percentile 24-hour average PM _{2.5} concentration. c.Boulder, Colorado 98th percentile 24-hour average PM _{2.5} concentration.

µg/m³ = micrograms per cubic meter

NO₂ = nitrogen dioxide

PM₁₀ / PM_{2.5} = particulate matter less than or equal to 10 microns / 2.5 microns in size

There were several conservative assumptions included in the near-field emissions inventories and air quality impacts assessment including the number of large engines that are used during the development / construction phase as well as the application of the EPA Tier 2 NO_x to NO₂ conversion factor (0.80) for estimating NO₂ impacts. In addition to the EPA Tier 2 NO_x to NO₂ conversion factor application, assessments implementing AERMOD's Plume Volume Molar Ratio Method (PVMRM) processing could be completed for estimating NO₂ concentrations. Detailed information from oil and gas drilling / development operators could be used to develop refined emissions inventories that would likely result in lower NO_x emissions estimates for construction phase equipment due to the conservative estimate of large engines that are used during the development / construction phase.

References:

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